LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

Master Final Work

Project – Equity Research

Novartis AG. (NVS)

Master in Finance

Sofia Isabel De Miranda Castilho

October 2018

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Supervisor:

Prof. Doutor Pedro Rino Vieira

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Abstract

This project follow restricted presentation rules, aligning the style and regulations of ISEG Master Final Project with the CFA Institute (Pinto, Henry, Robison, and Stowe, 2010) recommendations, consolidated in this new presentation format for this kind of projects.

This project contains detailed information and studies developed about Novartis AG. Choosing this company wasn´t properly a difficult choice, since I always had curiosity about pharmaceutical industry and its main features of continuing hard working and investments around innovation and investigation, influenced by arising new diseases globally, that makes it an endless industry in that matter.

The price target of Novartis AG was computed using the Discounted Cash Flow (DCF) approach. In order to support this valuation method, the Relative Valuation method was also performed. I reached similar results through both methods.

The price target obtained in the course of the work performed about Novartis AG (NVS) was $89.52, which represents and upside potential of 4,44% comparing with the stock price at 2018, October 16th. Regarding the full analysis about Novartis AG (NVS) the final recommendation is Reduce, considering a medium risk assessment estimation for Novartis AG.

Resumo

Este trabalho final de mestrado segue regras restritas de apresentação sugeridas no estilo do Trabalho Final do Programa de Mestrado do Instituto Superior de Economia e Gestão – Universidade de Lisboa e também do CFA Institute (Henry, Robison, Pinto and Stowe, 2010), seguindo assim o novo formato de apresentação deste tipo de trabalho final de mestrado, projeto.

Este trabalho contém informação sobre a empresa Novartis AG e estudos sobre a mesma. Escolher esta empresa não foi propriamente uma tarefa árdua pois sempre tive imensa curiosidade sobre a indústria farmacêutica por ser uma indústria onde não se consegue projetar um fim e desta maneira um setor com um constante trabalho de investigação e inovação para acompanhar a evolução das doenças da humanidade, com todos os custos que esta tarefa acarreta.

Numa primeira instância foi feito um estudo do negócio incluindo uma estrutura de negócio da companhia por cada divisão da mesma (Innovative Medicines, Sandoz e Alcon), posteriormente foi esmiuçada a estratégia de negócio da firma muito assente na inovação. Seguidamente, foi analisada estrutura de gestão da empresa.

O price target desta avaliação foi calculado através do método dos Fluxos de Caixa Descontados (DCF). Para dar suporte a este método de avaliação alineei também o método dos Multiplos Comparáveis. Desta forma com dois métodos diferentes consegui chegar à mesma recomendação.

Neste trabalho foi também feita uma análise de riscos inerentes ao setor e à empresa. A Novartis AG. enfrenta como principais riscos substanciais aqueles associados à vida útil das patentes e ao sucesso ou não dos novos blockbusters que desenvolvem. Associado também ao risco de sucesso dos novos produtos associa-se o custo em R&D gasto nos mesmos, que em diversas situações não tem retorno algum.

O price target obtido foi de $89.52 que representa assim uma valorização de 4,44% quando comparado com o preço da ação a 16 de Outubro de 2018. A recomendação é de Reduzir a exposição e o risco estimado associado à Novartis AG (NVS) é risco Médio.

Acknowledgements

This project was a long and hard journey but very rewarding at the same time. Writing this thesis would never be possible without the unconditional support of my family, friends and mentors.

To my family, thank you for the unconditional support, encouragement and valuable insights through all my life path, hat made me achieve all my personal and professional goals.

To my friends, thanks for the friendship and good moments we spent together on this journey and thanks for the push, making sure I make it through this final work.

To my boyfriend, thanks for always having my back, for the support and patience during these months, for the friendship and for being part of this journey.

To Professor Pedro, thank you for the support, time patience and friendship during this process, I can truly say you contributed a lot to shape me as a professional, with your guidance and advices. It's been an honor to learn from the finest professors from ISEG.

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1. Research Snapshot

Price Target at December 31th, 2018: **$89.52**

Upside potential: **4.44%**

Risk: **Medium**

Recommendation: **Reduce**

With this analysis, my recommendation for Novartis AG. investors is to **Reduce** by a price target of **$89.52** that means an upside potential of **4.44%** when compared with $85.72 at 2018, October 16th.

The price target was calculated through the **Discounted Cash Flow** valuation. To support this valuation method I used as well the **Multiples Approach** I reached a price target of **$91.96** and an upside potential of **7.28%**. Both valuation methods lead me to recommend to **Reduce**. This price target, above the current price makes the company undervalued at this time.

Concerning the **Risk Assessment** that I did I consider that Novartis AG has a **Medium Risk** due to some huge factors this company has to face these days.

In what concerns to the key drivers of the profitability of the company, the main division of Novartis AG. is **Innovative Medicines** that brings to Novartis AG more than 2/3 of total net sales of the company. It's expected that Novartis AG. revenues continues to grow in the next forecasted years with a growth rate of 2,36%.

It is predictable, by my valuation, that Novartis AG. continues to be one of the bigger pharmaceuticals companies, with higher profits in the next years. It is expected investments due the fact of the patents expiration of old blockbusters and the need of the launch of new blockbusters.

Figure 1: Net sales by division

Source: Novartis AG. Annual report

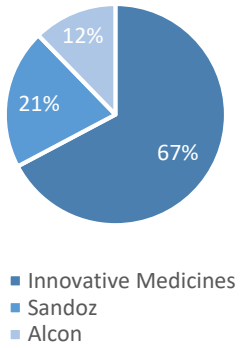


Table 1: Market Profile

Source: SC analysis

Moody's Rating	**A1**
Price at 2018/10/16	$85.72
Price Target	$89.52
Ticker	NVS
Industry	Pharmaceutical
Peer Group	Pharmaceutical

Table 2: Investment recommendation matrix

Source: BPI risk matrix

	Low Risk	Medium Risk	High Risk
BUY	>15%	>20%	>30%
HOLD	>5% and <15%	>10% and <20%	>15% and <30%
REDUCE	>-10% and <5%	>-10% and <10%	>-10% and <30%
SELL	<-10%	<-10%	<-10%

Table 3: Valuation Methods

Source: SC analysis

DCF	$89.52
Multiples	$91.96
Risk Assessment	Medium risk

Table 4: Novartis AG Financials

Source: SC analysis, Millions of US Dollars.

	FY 2017	F2018	F2019	F2020	F2021	F2022	Perp.
Revenues	49 109	49 805	50 980	52 182	53 413	54 672	56 061
Cost of Goods sold	17 175	16 436	16 823	17 220	17 626	18 042	18 500
Operating Expenses	23 305	22 835	23 374	23 925	24 489	25 067	25 703
EBIT	8 629	10 783	10 783	11 037	11 297	11 564	11 857

2. Business Description

Novartis AG. (NVS) is a global healthcare company based in Basel, Switzerland, dedicated to develop new healthcare products in order to provide solutions both for patient and society's needs. Novartis that counts with more than 150 years of history provides pharmaceuticals, generic drugs, over-the-counter drugs, vaccines and diagnostic tools.

This company was born in 1996 from the merge between Ciba-Geigy and Sandoz and nowadays is one of the largest pharmaceutical companies (see Figure 2), counting with over 126 000 employees around the world.

Figure 2: Novartis AG. offices
Source: Novartis AG. data

Innovation

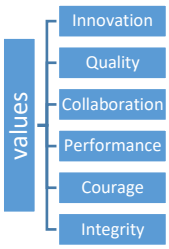
Is predicted that **biomedical innovation** will continue to accelerate so that the continuous research of the molecular mechanisms of diseases combined with new and more targeted treatments will result on better outcomes for patients.

Digital technologies will lead the company in a new era of therapeutic assistances, leaving behind the traditional medical treatment. Combining both medicines and digital technology the patients will benefit from an improved quality of care and treatment.

The healthcare data analysis combined with **statistical methods and artificial intelligence (AI)** provides a faster way in diagnose and patient treatment. The combo of AI, data and doctor's knowledge will result on a better access to the information of a patient and the whole medical data about the individual or even his family will be easily available, resulting in active prevention of diseases. All these factors will also improve drug research and development.

The digital innovation will lead us to a higher standard of efficiency in every medical field.

Figure 3: Novartis AG. values
Source: Novartis AG. Annual report



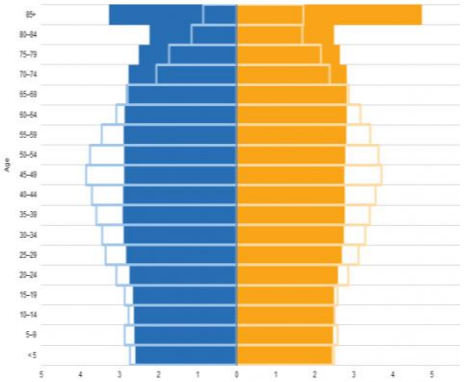
Aging of population

A developing world means people living longer(see figure 4) and fast urbanization, both factors resulting in lifestyles changes that are contributing to an increase of chronic conditions such as cardiovascular diseases, respiratory diseases and cancer. At the same time, many countries in the world want to expand their population access to healthcare. As a result of this increasing demand for healthcare, the spending in this area will grow at 4,3% between 2015 and 2020 according to IMF.

Government and health insurers are already increasing the use of generics, price cuts, and even controlling the access to some therapies. On the pharmaceutical industry side they are exploring new pricing models and delivering innovative treatments that lead to more benefits for the patients.

All of these concerns are in line with the company's values (see figure 3).

Figure 4: Population pyramid, EU-28, 2016 and 2080
Source: Eurostat



Solid color: 2080
Bordered: 2016
Blue: men - Orange: Women

Company structure:

The **Novartis Institutes for BioMedical Research (NIBR)** is the tool of innovation and promotes the research of new medicines that that can change the medical practice as we know it.

The **Global Drug Development (GDD)** has the main function of estimate the potential new products in the company's pipelines and choose the projects that maximize the value of the in-line products.

The Divisions (Figure 5):

Innovative Medicines represented more than a half of the net sales of Novartis in 2017(Figure 6). This division is formed by two core business units, **Novartis Oncology** business unit, which is more focused on treatments for a diversity of cancers and rare diseases, and **Novartis pharmaceuticals,** targeted on patented treatments in some other areas (figure 7). Novartis pharmaceuticals is the core business unit of the company, reaching 63% of the net sales of Innovative Medicines division.

Sandoz has the function to offer medicines and healthcare to the population and also helps on expanding the access to these medical products in the whole world. In fact, this division has three global businesses, but the one that has the higher impact on Sandoz net sales is Retail Generics (figure 8).

Alcon is specialized on products and equipment for eye surgery and products for eye care, mostly lens care solutions.

Novartis Operations:

Novartis Technical Operations (NTO) do the manufacturing of Innovative Medicines and Sandoz.

Novartis Business Services (NBS) oversee of financial services, human resources, information and technology, product lifecycle services, real state and management

Company strategy:

Novartis believes that science and innovation are the key for an efficient strategy, allowing the discovery of innovative ways to improve and extend people's lives.

This company has identified some must have priorities in the most important nowadays areas of innovation, digital technology and scale.

Further strengthen innovation: Investing in research and development (R&D) prioritizing innovation that produces change in the practice of medicine.

Drive a digital transformation: In all lines of business like R&D, sales and operation. With an evidence in data analysis, artificial intelligence and other technologies in a way to extract a huge amount of information consolidated.

Growing areas of healthcare: Reinforce the presence in growing areas of healthcare such as oncology, cardiology, ophthalmology, immunology and dermatology, and other medical fields. In terms of markets, Novartis plans to reinforce the presence in the US, Japan and in emerging markets such as China.

Figure 5: Novartis Divisions
Source: Novartis annual report 2017

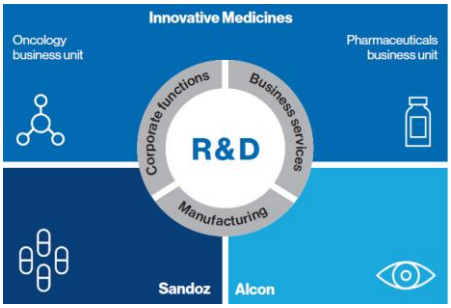


Figure 6: Net sales by division
Source: Novartis AG. Annual report

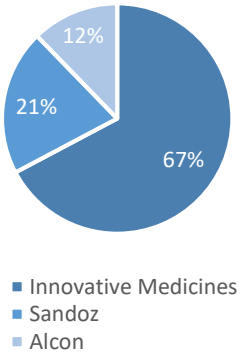
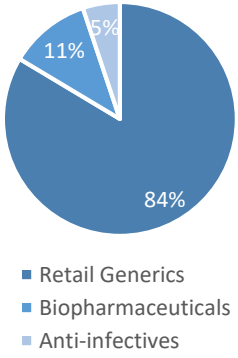


Figure 7: Innovative Medicines treatments areas
Source: Novartis AG. Annual report

Novartis Oncology	Novartis Pharmaceuticals
• Cancers • Rare diseases	• Ophthalmology • Immunology and dermatology • Neuroscience • Repiratory • Cardio-metabolic

Figure 8: Sandoz treatments areas
Source: Novartis AG. Annual report



Innovation:

The company is increasing her way to innovate using internal and external sources. In that way, the role on **open innovation** it's getting bigger. They launched the Genesis Labs for their collaborators where they can form a team with an idea outside of the scope of the departments at NIBR and then present a pitch to a panel of scientists. The best projects will receive funding to and the collaborators moved from their previous jobs to the new project for a period between 6 to 18 months.

The company is inviting academic investigators to share information or ideas and then academic researchers have access to a discovery investigation and platforms while Novartis researchers can learn directly from them.

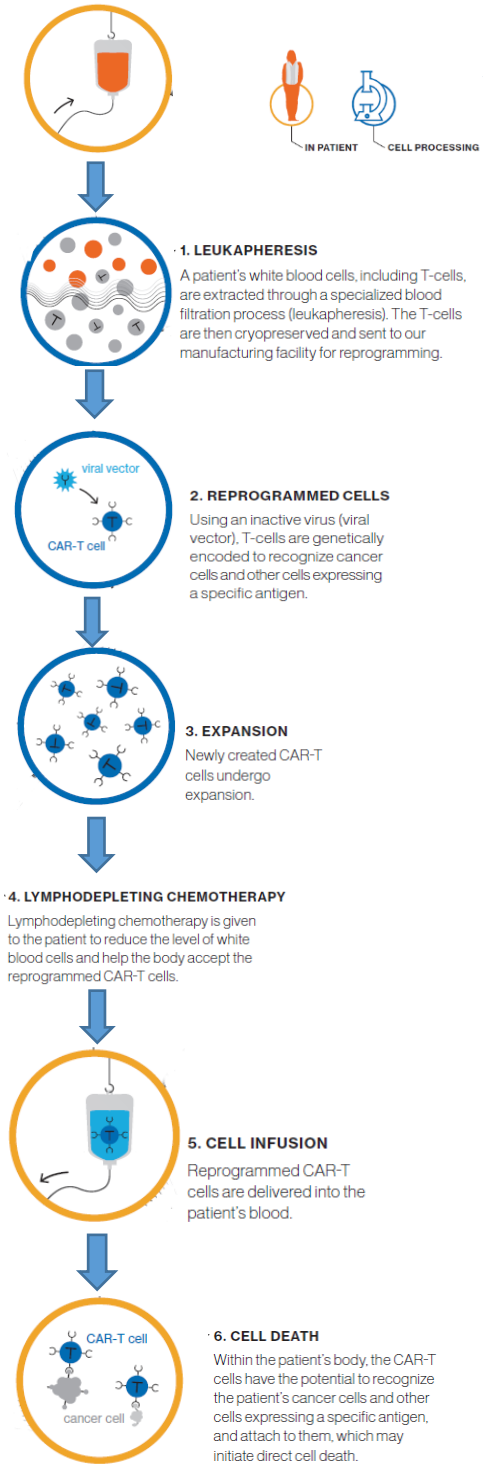
They are investing in **new tools and technologies,** for example, they are using an app to assist on the follow up of heart failure. The patients use a smart watch to track their physical activity, symptoms, sleep, and other parameters that might help to predict the deterioration of the condition. Novartis believes data-centered innovation and artificial intelligence will provide more efficiently treatments for neurological and immunological disorders or even cancers and other diseases.

Some key development projects have a huge potential to change the medical practice and improve patients outcomes:

Immuno-oncology (see Figure 9): As cancer is considered to be the second most common reason of death in the world, innovation and advanced treatments concerning this topic are, beyond doubt, one of the most important areas. The basics of **CAR-T therapies** are taking T-cells (a specific type of white blood cell) and modify them genetically to track down and destroy cancer cells, with minimal damage to normal cells. The most advanced CAR-T therapy, *Kymriah,* as already been approved by Food and Drug Administration.

Fatty liver disease, obesity and type 2 diabetes have become of huge significance to Novartis, due to their high prevalence in the population. Other treatments have been developed to fight asthma, malaria and other prevalent conditions.

Figure 9: CAT-T therapy process
Source: Novartis AG. Annual report



Corporate Responsibility:

Concerning corporate responsibility, Novartis principles state that everyone should have access to healthcare. The company is turning its products more accessible with programs like *Novartis Access,* which provides treatment for chronic diseases in lower income countries. The company combines different methods involving products and funding along governments, nonprofit organizations, the company collaborators, and foundations that can provide access to healthcare and strengthen healthcare systems in these countries. Other corporate responsibility concern is fighting counterfeit medicines and provide health education and prevention.

3. Management and Corporate Governance

Corporate Governance:

The **General Meeting of Shareholders** has the main functions to approve financial and operational evaluation, financial statements (consolidated and Novartis AG.), fitting earnings and dividends, commend compensation of Board and Executive Committee, deciding about election of Board members, Chairman, Compensation Committee, external auditors. The company chooses an independent, non-executive Chairman and a separate CEO.

The Board of Directors:

The Board of Directors is composed by 13 non-executive and independent members (Figure 10) where Reinhardt is the Chairman and Vanni is Vice Chairman. The allocation of the board is made by five committee (Figure 10). The guidelines of the Board are direction, strategy, organization and administration of the company. The Board has meetings without the CEO and other Executive Committee members and with those as well. The diversity of the board, in terms of nationality, gender or even age (Figure 11) and of the Governance, Nomination and Corporate Responsibilities Committee (GNCRC) both represent significant points of efficiency and diversity.

Audit and Compliance Committee: In 2017, this committee worked on the issues of reporting requirement such as accounting and compliance rules. Other topics were taken into account such as tax questions, compensation topics and the external auditors results and potential rotation.

Compensation Committee: The main topics in this committee last year were conclusions about CEO succession, analysis of the Board and committee fees and possible variations, the repayment scheme of the Executive Committee and possible changes to the Annual Performance Plan.

Governance, Nomination & Corporate Responsibilities Committee: The responsibility of this committee comprises on supervising the policies and procedures of the Board and its committees, recommending on Board committees and committee Chairmen, the planning for the Board, CEO succession, reviewing of company's responsibilities such as the company's performance in such areas as Environment, Society and Governance (ESG), giving special attention to ratings and indices.

Research & Development Committee: This committee has the main function to lead the research and development projects in every medical area and is also responsible for all the innovation projects.

Risk Committee: This committee cares about data privacy, about the risks associated with the change of operating model, risks related to Alcon, Novartis Technical Operations department, IT and supervision of patient and medical activities.

Figure 10: Board of Directors
Source: Novartis AG. Annual report

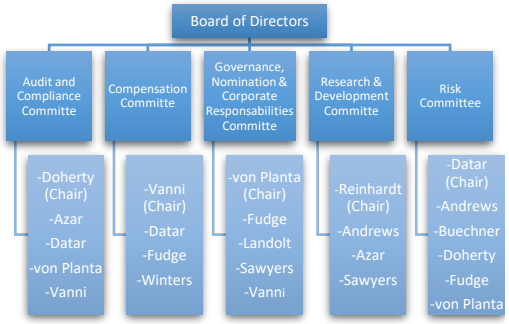
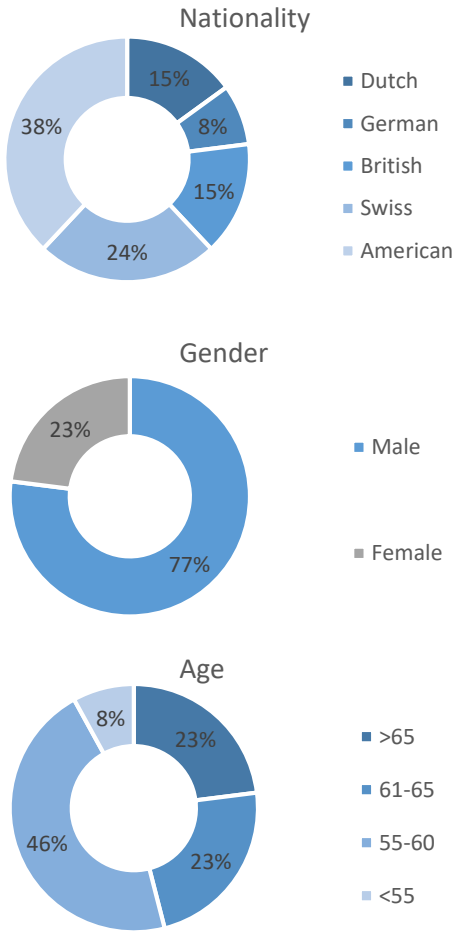


Figure 11: Board Diversity
Source: Novartis AG. Annual report



Management:

The Executive Committee:

The Executive Committee of Novartis (ECN) has the responsibility of overseeing the whole business operations of the group Novartis. This committee has to provide sufficient information to the Board, so they can perform its duty and make the right decisions. The ECN members (Figure 12) are selected by the Board of Directors.

Shareholder structure

The Shareholder structure at 31st Dec 2017 had a share capital of CHF 1,308,422,410 divided into 2,616,844,820 registered shares with a nominal value of CHF 0.50/share. The company's shares are listed on the Swiss Exchange (SIX) and on the **New York Stock Exchange (NYSE)** in the form of **(ADRs) American depositary receipts,** which represents American depositary shares (ADSs). An ADR holder has the rights agreed in the deposit agreement like the right to receive dividends or even give voting orders. The ADS depositary of the company is JPMorgan Chase Bank that holds the underlying asset of ADRs, Novartis shares. JPMorgan is registered as a shareholder in the Novartis share records. ADR holders exercise their voting rights by instruction the JPMorgan to exercise that and each ADR represents one Novartis share.

The shares at the end of 2017 (Table 5) were listed at CHF 74.10 recording an increase of 11.2% when compared with the previous year. The ADRs has recorded the same trend with a growth of 15.3% in 2017. In result of that, the market cap at the end of 2017 was 195.5 B, making Novartis the biggest pharmaceutical in 2017 in terms of market cap.

Because the continuous good results, the Board proposed an increase of 2% in the dividend payment to CHF 2.80, in 2017.

Concerning the shareholder structure, the most of the shares are held by Nominees, fiduciaries and ADS depositary that represent 51.39% of the shares, and another portion by legal entities that own 35.25% of the shares. The shares are mostly held by Switzerland investors with 42.56% of the shares, United Kingdom and American investors with 22.22% and 25.82% of the shares, respectively.

Figure 12: ECN Members
Source: Novartis AG. Annual report

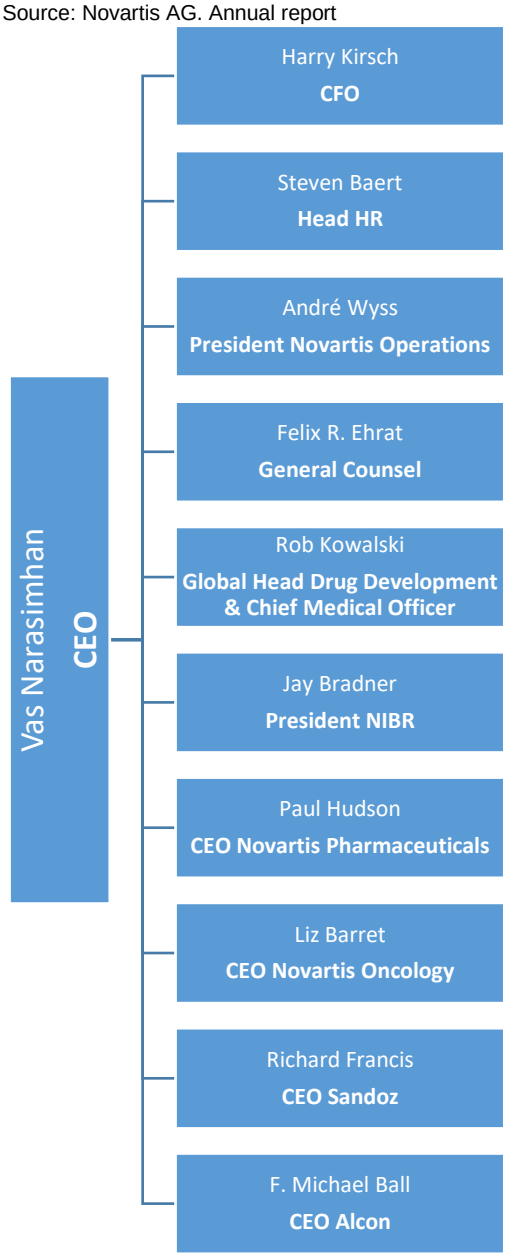


Table 5: Key Novartis Share data
Source: Reuters

	2016	2017	Variance%
Shares finished at	CHF 82.40	CHF 74.10	+ 11.2%
ADRs	USD 72.84	USD 83.96	+ 15.3%
Market Cap	USD 172 B	USD 195.5 B	+ 13.7%

4. Industry Overview & Competitive Position

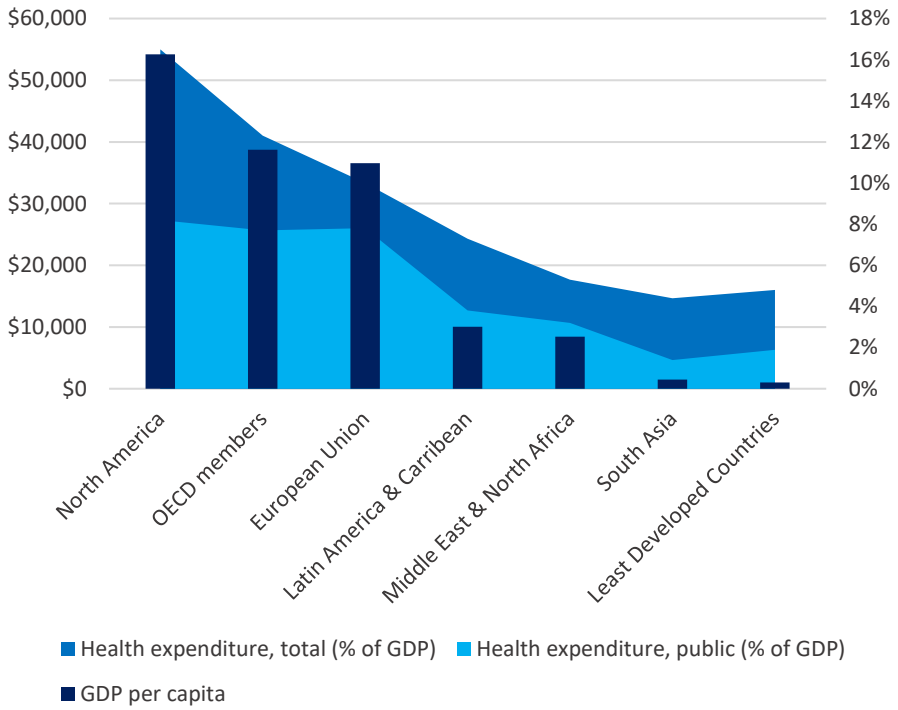
Macroeconomic Outlook:

Wealth:

Wealth, measured typically as GDP or GDP per capita, constitutes a significant driver for healthcare expenditures, which involves pharmaceuticals as a critical component.

While in developed countries the average healthcare expenditures are between 10%-16.5% of total GDP, the least developed countries record 4.8%, in 2014 (Figure 14).

Figure 14: Relationship between Health expenditure and Wealth



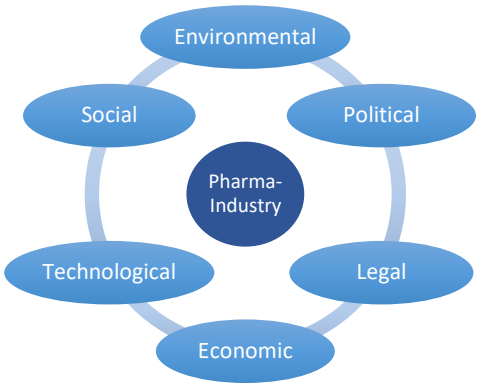
Between 2014 and 2016 there was a reduction in terms of global GDP growth (Figure 15), directly influenced by the political and financial issues faced worldwide. For the following years, the Internal Monetary Fund predicts that the global GDP is going to increase between 3.4% and 3.8%, in response to this, the **global economic outlook** seems to be **satisfactory.**

Regarding **advanced economies**, it was registered a drop on GDP from 2014 to 2015, due to the impacts of deflation and large amounts of debt over quite a few countries, but for the coming years, the IMF forecasts these fluctuation will be around 1.8% (Figure 16).

For the same temporal range (2014-2015) **emerging markets and developing economies** attended a negative growth due to the hyperinflation of some countries in Latin America such as Venezuela that results on a recession of these countries.

Because of GDP growth wealth growth has a positive shift as well mostly in advanced to economies, this leads us to a positive macroeconomic outlook for pharmaceutical industry (Figure 16).

Figure 13: PESTEL



Political:
- Access of public healthcare infrastructure
- Austerity politics: cost-cutting measures, pressure on pricing freedom
- Tax rates, social security contributions

Legal:
- Patent law and industrial property rights
- Regulation standards in various fields

Economic:
- Public and private wealth (GDP, GDP/capita)
- Healthcare financing sources: taxes, social security contributions, employment

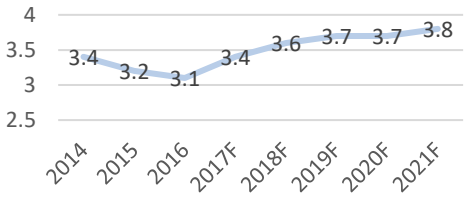
Technological:
- Big Data and data analytics for personalized treatments
- IoT and preventive healthcare, R&D

Social:
- Population growth, but unequal distributed
- Aging of population
- Increase in chronic diseases
- Sedentary lifestyles

Environmental:
- Global warming
- Pollution and air quality

Figure 15: Global GDP Growth

Source: IMF, Growth in Percentage



Population Growth:

The population growth suggest a potential increase in pharma treatments. Nevertheless, must be paid attention to the **unevenly growth distribution**. While main potential pharmaceutical sales regions such as Europe and North America stagnate (-0.03% and 0.69%, respectively), population growth occurs in underprovided areas (Figure 16). Furthermore, the increase in **population mean age** leads to take **longer treatments** that open new sales opportunities. **High life expectations** due to the increase of population mean age is statistically correlated with **grater propensity for diseases.** Joined with sedentary lifestyles, this leads to a huge occurrence of chronic diseases.

Regulatory environment:

Political and **regulatory forces** are essential elements of the pharmaceutical industry. Governments sustain the **public healthcare** structure, which accounts 6% of expenditures when compared with world GDP and 60% of public expenditures versus 40% of private expenditures. This budget are under pressure due to world debt levels and austerity politics and results in pressure pricing and cutting off specific services.

Additionally, internal regulator, Food and Drug Administration (FDA), in the U.S. and European Medicines Agency (EMA), in E.U. exercises a severely control in pharmaceuticals companies concerning several performance of key drivers like **patent laws, R&D approvals** or even **pricing**.

In what concerns to a new drug approval FDA and EMA processes are very similar (Figure 18). Only after the approval of both regulators, Novartis can go further to the launch of new medicine or treatment.

Figure 18: Drug approval processes in FDA versus EMA

FDA	EMA
APPLICATION: application to the FDA for permission to conduct clinical studies and transport drugs across states.	**APPLICATION:** application within one or more states of the E.U. for approval to conduct clinical studies; each state designates its own regulatory body that will carry out approvals.
CLINICAL TRIALS PHASE: **Phase 0 and 1 trials:** small number of healthy subjects, clarify pharmacology and dose range **Phase II trials:** several hundred patients with the target condition, to determine dose/reponse relashionship. **Phase III trials:** several hundred to several thousand patients to show safety and efficacy.	**CLINICAL TRIALS PHASE:** **Phase 0 and 1 trials:** small number of healthy subjects, clarify pharmacology and dose range **Phase II trials:** several hundred patients with the target condition, to determine dose/reponse relashionship. **Phase III trials:** several hundred to several thousand patients to show safety and efficacy.
New drug application to the FDA.	**4 Pathways to drug approval:** 1. Centralized process through the EMA for designated drugs. 2. Application to the designated national body within a single EU state. 3.Mutual recognition: after approval in a single state, application for mutual recognition in all states via the EMA. 4. Decentralized process: simultaneous application in multiple EU states.

The expiration of a patent or licensing rights is a threatening obstacle of pharmaceutical industry. Each pharmaceutical company has a portfolio of patented products and these intellectual property rights has different expiration dates. Once the patent has expired, the company has no longer the exclusivity of their medicine and generic pharmaceuticals are completely able to produce resembling medicines and sell them for a more competitive price.

Figure 16: Advanced and Developing Economies GDP growth

Source: IMF, Growth in Percentage

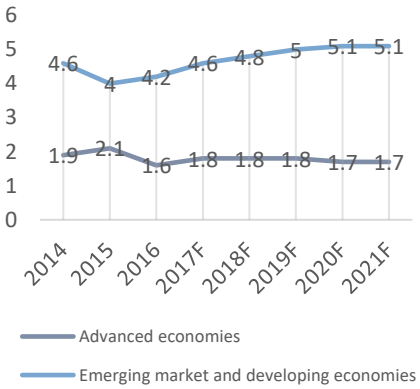
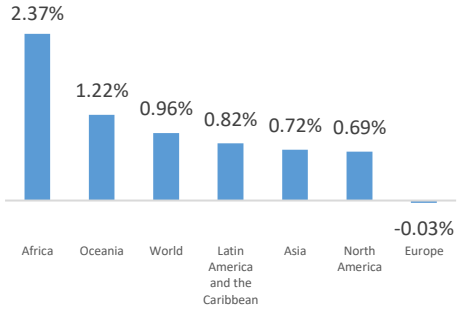


Figure 17: Pharmaceutical Revenue Growth vs. GDP/capita growth

Figure 19: Population Growth (2017-2030)

Source: United Nations



Industry Overview and Key Drivers of Profitability:

The pharmaceutical industry plays a central role in making human **life healthier**, making a **sustainable healthcare system**, or even **providing additional jobs**.

The largest pharmaceutical market, North-America, held a market share of 49% in 2016 of total revenue of pharmaceuticals, followed by Europe with a smaller share of 21.5% in the same period (Figure 20). The market with a bigger growth (+4.7% CAGR) from 2010 to 2016 was Africa, Asia and Australia.

The **highest revenue** is provided by "**blockbuster-drugs**" that represents 1$ billion of annual revenue and, this way, can cover huge R&D expenses. On pharmaceutical, block-buster drug is a medicine that generates sales of many millions for the firm that sells it.

This industry is the major leader in R&D when compared to other manufacturing industries. In United States, the pharmaceutical industry invests twelve time more per worker in R&D and has the highest CAGR in this type of investment. This industry is characterized by a massive R&D spending and huge growth rates. The R&D-to-sales ratio is the highest when compared with others manufacturing industries (Figure 21).

The **R&D process** is long and **risky**, companies' take an average of thirteen years to develop a new medicine with a probability of enter in the market of 1 in 10000. So, with a patent term of twenty years only left seven years of patent protection, effectively. After the expiration of the patent, cheap generics enters into the market making the prices go downward. Therefore, time-to-market is a key factor of success, the first to arrive the market with a new product can achieve from 40% to 60% of the market share.

The second major pharmaceuticals cost drivers are Advertising and Selling, General and Administrative expenses due to promotions and sales representatives to convince doctors and hospitals to buy their products.

To face challenges like as the threat of generic competition or patent expirations, pharmaceuticals have solutions such as M&A projects to reduce the risk and expenses with R&D projects.

Figure20: Distribution of Revenue
Source: Thomson Reuters

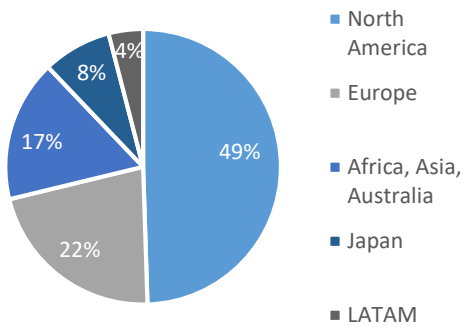
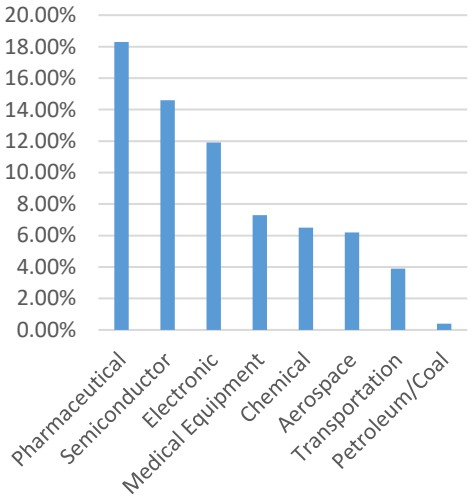


Figure 21: R&D-to-sales ratio by industry
Source: Thomson Reuters

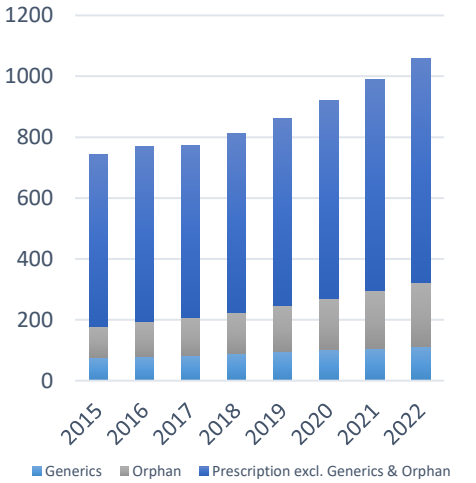


Demand and Supply:

The demand for medications can be measured by its prescription, provided by the doctors, and depends on the economic trends already mentioned, like the increase of chronic diseases as a result of the aging of the population, sedentary lifestyles, rise of government expenditures and so on. The demand for medicines measured through Prescription is represented in Figure 22 where we can see a growth trend from 2015 to 2017, and a forecasted growth rate (CAGR) of 6.5% for the next years until 2022. This growth can be explained by the expansion of existing therapies as well new therapies.

On the demand side (Figure 23), there is a visible growth potential. Specifically in emerging markets and developing economies, there is a considerable rise in demand, leading to a growth in medium and long-term. The rise of generics will boost consumption and at the same time decreasing margins, while personalized treatments create new profitable customer needs. The actual growth of world population that leads to older and more sedentary citizens will result in more health complications in the future that provide an increase in the consumption of medicines and therapies. Another key driver of consumption is the increasing of chronic diseases like heart disease, cancer, diabetes and asthma. Due to all these factors, the **consumption of medicines** seems to be **favourable** on the Novartis outlook.

Figure 22: Worldwide Total Prescription Drug Sales (2015-2022)
Source: Pharma World Preview 2017, $bn.



On the supply side, the **exchange rates** can have a significant effect on profitability, costs and earnings as well as on companies' balance sheet values. The volatility of the currencies can be hard to predict at the same time that can affect revenues and potential losses. Countries could be facing several economic or financial limitations like high inflation rates or high levels of debt that can impact the exchange of foreign currency. This represents a **moderate risk** for Novartis AG. In a way to mitigate this exposure to the exchange rates fluctuations firms can enter in hedging contracts.

Other situations are equally important on the supply issues as we can observe on Figure 24.

The loss of exclusivity provided by the patent will lead to a huge supply of generics and this way, a price competition. So both outcomes are negative and positive, respectively. To mitigate the price competition of generics the R&D expenses tends to increase the innovative projects that will lead to a treatments more focused on patient. This will change the whole business model of pharmaceuticals.

Liquidity, cash flow and capital resources:

Novartis AG has a **solid position** taking into account the environment of the industry. The FCF (Free cash flow) amounted in 2017 was USD 10428 millions (Table 6), more 10% when compared with the previous year. This increase can be explained by lower legal payments and favourable working capital changes. The strong FCF, assets**, easy access to capital markets** that allows the company to use credit seems **favourable** to the liquidity requirements and a successful future.

Table 6: Novartis AG Free Cash Flow

Source: Company data

(USD millions)	**2017**	**2016**	**Change**
Operating income	8629	8268	4,37%
Operating income adjusted for non-cash items	14761	15135	-2,47%
Cash flows from operating activities	12621	11475	9,98%
Free Cash flow	10428	9455	10,29%

On the other hand the company's net debt increased 18.86%(Table 7) when compared with the previous year, reaching USD -19047 millions, mainly driven by an increase in borrowings.

The long-term credit rating remains with high quality investment grade by Moody's, Standard & Poor's and Fitch (Table 8). Due to this factors it's not predictable any change in terms of liquidity needed.

Table 7: Novartis AG Net Debt

Source: Company data

(USD millions)	**2017**	**2016**	**Change**
Total financial Debt	-28532	-23802	19,87%
Total liquidity	9485	7777	21,96%
Net Debt on December, 31	-19047	-16025	18,86%

In terms of **financing** the cash flows used by Novartis AG in financing activities were USD 7733 millions in 2017, which increased when compared with USD 5314 millions in 2016. This increase result from the cash outflows from the payment of dividends (UDS 65000 millions) and from the net treasury transactions of USD 54000 millions and the cash inflows of non-current and current financials debts of USD 40000 millions.

Peer Group Analysis:

Figure 23: Positive and negative conditions on demand

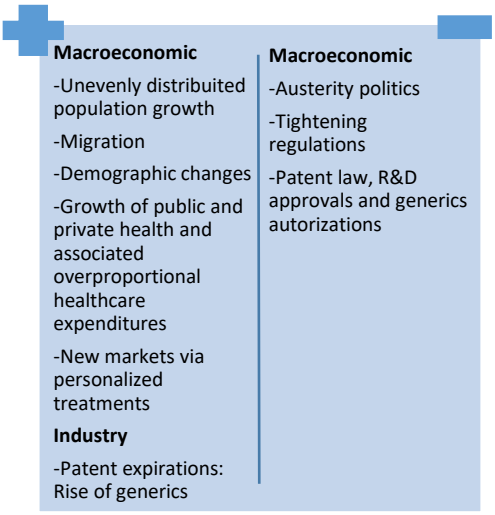


Figure 24: Positive and negative conditions on supply

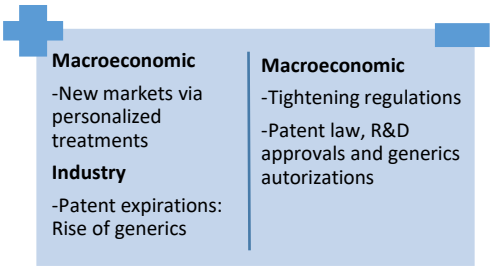


Table 8: Novartis AG. Rating

Source: Bloomberg

Agency	**Novartis AG. Shor-term credit**	**Novartis AG. Long-term credit**
Moody's	P-1	Aa3
S&P	A-1+	AA-
Fitch	F1+	AA

This point will be analysed in more detail when considering **Multiples** on the **Relative Valuation**, due to the importance that comparing the performance of similar companies have for investors. Novartis AG has many competitors in its business units. The main competitors are represented on table 9 ranked by net income. In terms of market share, Novartis AG has around 124% and in 2017 was outperformed in terms of net sales only by Johnson & Johnson and Roche Holding AG (Table 10). The position of Novartis AG. in terms of Market Cap it seems favourable to maintain the reputation of the firm like one of the biggest in the industry(Table 10).

The peer group involves 10 global pharmaceutical that belong to the biggest companies in the industry and are public traded. These companies are based in Europe and United States where they have their core business. One of the key strategies of these companies is to adjust its portfolios to make a successful block-buster drug and this way mitigate the huge costs and risks with R&D projects. Constant development strategies to follow this change of industry involve external investment like partnerships with other pharmaceuticals or technology companies, acquisitions of smaller pharma companies. Expand even more for emerging markets it's another way to achieve other promising opportunities.

Table 9: Novartis AG. Peers
Source: Reuters, USD millions

Identifier	Company Name	Net Income
PFE.N	Pfizer Inc	21 308
SASY.PA	Sanofi SA	10 342
ROG.S	Roche Holding AG	9 321
BAYGn.DE	Bayer AG	8 945
NOVN.S	Novartis AG	7 703
MRK.N	Merck & Co Inc	2 568
GSK.L	GlaxoSmithKline PLC	2 126
JNJ.N	Johnson & Johnson	1 300
BMY.N	Bristol-Myers Squibb Co	1 007
LLY.N	Eli Lilly and Co	-204
Average		6442

Competitive Position:

To understand the strategic situation and position in the market of Novartis AG. on external and internal approaches it is important conduct the SWOT analysis.

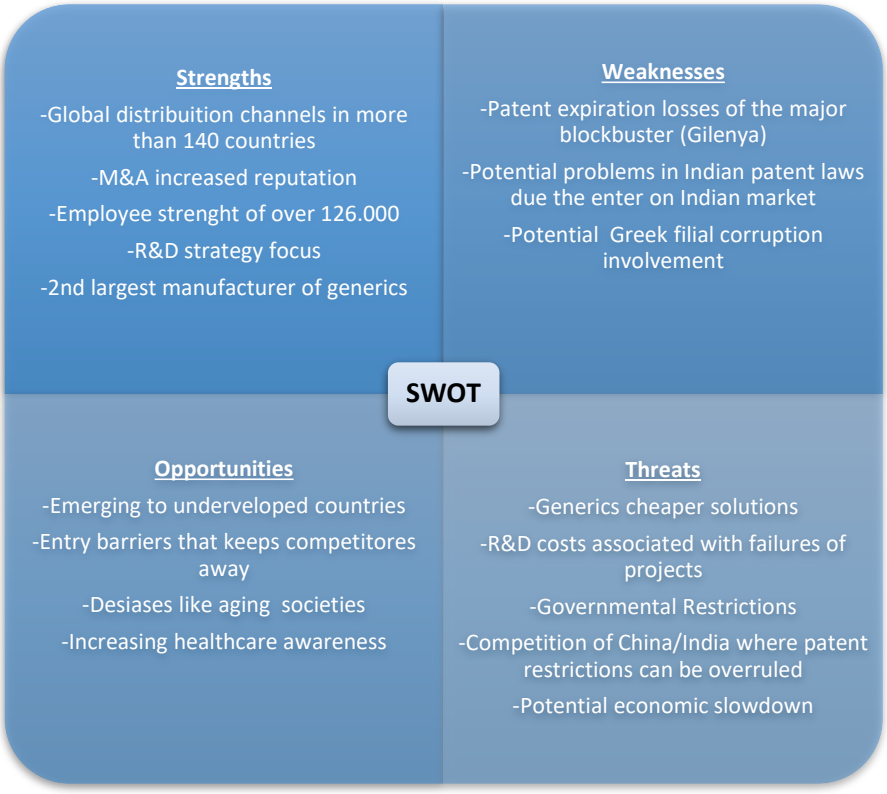


Table 10: Novartis AG. Peer Group
Source: Reuters, USD millions

Company Name	Market Cap ($M)	Net Sales ($M)	Market share	Price Close
Johnson & Johnson	354 967	76 450	19,0%	133,06
Pfizer Inc	216 387	11 502	2,9%	36,58
Novartis AG	**215 825**	**50 135**	**12,4%**	**82,03**
Roche Holding AG	209 299	54 705	13,6%	232,08
Merck & Co Inc	147 751	40 122	10,0%	55,25
Bristol-Myers Squibb Co	108 779	20 776	5,2%	66,25
Sanofi SA	101 357	43 430	10,8%	81,49
Bayer AG	97 764	42 004	10,4%	116,69
GlaxoSmithKline PLC	90 611	40 787	10,1%	18,27
Eli Lilly and Co	85 993	22 871	5,7%	78,75

The analysis shows that Novartis AG. is facing a lot of strengths, weaknesses, opportunities, and threats. Most of them have already been spoken. A huge weaknesses is that there is an investigation about a possible corruption situation between Novartis Greek filial and some of greatest greek politicans.The increasing threat of losses in income due to patent expiration and generic competition or patent restrictions that can be overruled in China/India due that the missing of strong regulation like U.E. or U.S.A., affects Novartis and all the peer group in general. Some

companies react to this faster than others, Novartis is expected to suffer severely from upcoming patent expiration of major blockbuster drugs like “Gilenya”. Novartis AG. follows an intense M&A-strategy which enables market leadership in certain areas.

Porter’s Five Forces Analysis (Figure 25):

To analyse the competitive environment and dynamics of the industry, I choose to use the Porter’s Five Forces framework. This methodology allows us to establish how certain conditions impact the profit structure of the industry by determining the way in which **economic value is created.**

Rivalry among existing competitors (HIGH):

This aspect is presumably the strongest force driving the pharmaceutical industry, which is characterized by its mature stage and a heavy consolidation trend (M&A). Companies that want to gain a competitive advantage not only need to surpass others in developing blockbusters but also make aggressive and defensive strategies. Furthermore, the increased innovation pressure and shift to niche markets forces pharmaceutical companies to enter strategic partnerships with biotech companies which are one of the most important types of collaboration and potential sources of breakthrough innovation.

Bargaining power of buyers (MEDIUM):

The strongest power may be exerted by pharmacies and healthcare insurance agencies satisfying subscriptions, however they rarely act in the interest of a patient as their focus is to maximize margins. Doctors entitled to prescribe drugs have significant influence on patients purchase behavior but must act within legal restrictions. Furthermore, patients are more aware of generics as cheap alternatives to branded-drugs, which results in increasing cost-sensitiveness.

Bargaining power of suppliers (LOW):

Impact of suppliers on the industry’s shape is relatively low. They are divided into three categories: suppliers of raw materials, biotechnology companies and manufacturers. Even though they have special knowledge in many areas, this is rarely enough to offset redundant supply forces. Raw materials are usually widely used in chemical-industry and pharmaceutical companies have virtually unlimited access to them. Regarding equipment, pharmaceutical companies have multiple sources available and can obtain products from several suppliers and even in case of more advanced needs they can negotiate favorable deals.

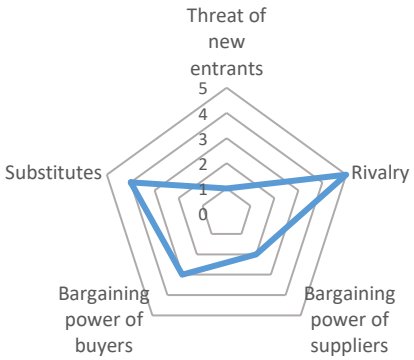
Threat of new entrants (LOW):

High entry barriers resulting from huge R&D investments, huge capital requirements and a complex approval process block the entrance of new competitors and enable a high profitability of the market participants. Moreover, there are significant R&D. SG&A and advertising economies of scale to be realised, giving rise to an ongoing M&A-consolidation, rather than new individual players in the market.

Threat of substitutes (HIGH):

This category comprises generics, and biologics. Substitutes such as alternative therapies or medical devices are minors’ threats but have been gaining popularity. Since high quality of the generics provides the same treatment effects as brand drugs at a significance lower price, they pose a significant threat as substitutes. Furthermore, developments in areas such as bioscience with the goal to directly alter and develop DNA sequences of an organism will at some point become a major shaping force of the industry.

Figure 25: Porter’s Five Forces



5. Investment Summary

In my analysis through the **Discounted Cash Flow method (DCF)** I reached a price target of **$89.52** (Table 11) representing an upside potential of **4.44%** comparing with the price at 2018 October 16th ($85.72). With a **Medium Risk** valuation lead us to a recommendation to **Reduce** (table 12). Also another analysis that I made was the **Multiples Valuation Approach** to support the previous recommendation in which I reached an average price target of **$91.96** and consequently an upside potential of **7.28%** (Table 13).

Investment Risks:

Already mentioned in this analysis some of the most dangerous risks for Novartis AG, and also for the whole industry. Nevertheless, in this point I will go further in some of the key risks that can't be controlled by management.

Expiration of patents and exclusivity of the products

As seen previously all of the pharma companies, including Novartis AG. face the competition of generics because it's cheaper to the buyers. Many of Novartis AG. products are secure by patent or property rights. The loss of any of these rights causes a negative impact on the results of the firm, mainly in net sales, and when we talk about major pipeline products this impact can be huge.

Deliver new products

The ability to keep and grow the performance of the industry to face generic and other competition is influenced a lot by R&D projects in recognizing and developing new treatments. So this process is long and risky due to the time of intellectual property rights versus the time it takes to develop and launch the product.

Success of key products

All of the products pipeline faces strong competition of new replaceable products from competitors. Patients and other clients have the power to choose which product or treatment to buy in terms of costs, efficacy or other indicator. So commercial success of major products has an important role in the company's performance.

Refund and pricing

Governments and clients in general continue to increase the healthcare costs due to, for example, the rise of average age that result in increase of chronic diseases. Factors such this have increased the pressure they face concerning the price at which medicines are sold and how to establish good refund rates by insurance companies, governments and other payers.

Foreign exchange oscillations

This company has subsidiaries in many countries with different currencies. So, each subsidiary has to adjust its reporting (STAT) on its currency to US dollar (USGAAP). Oscillations between currency of reports (USD) and other currencies can have an impact on the adjustments of reported balance sheet (sales), income statement(gains and losses) and cash flow.

Intangible assets and goodwill

Novartis AG. has an huge value of goodwill mainly because acquisitions of Alcon and oncology assets from GSK. Due to this, changes in impairments between Novartis AG. values and regulatory reviews may have impacts on operational results and financing situation of the firm.

IT and data security

Table 11: DCF method

Equity value	**213 561**
Net debt	17 639
Shares outstanding	2 386
Price at 16/10/2018	$85.72
Price target	$89.52
Upside potential	4.44%

Table 12: Investment recommendation matrix

	Low Risk	Medium Risk	High Risk
BUY	>15%	>20%	>30%
HOLD	>5% and <15%	>10% and <20%	>15% and <30%
REDUCE	>-10% and <5%	>-10% and <10%	>-10% and <30%
SELL	<-10%	<-10%	<-10%

Table 13: Multiples Valuation approach

Multiples analyzed	Price Target
EV/EBITDA	$90.49
P/B	$96.31
P/Sales	$89.08
Average Price Target	$91.96
Upside potential	7.28%

Cybercrime is a new reality that all of the companies face at this time. Novartis AG. is no exception, and has a deeply dependence of IT systems to help the business processes to store data. Internet, clouds and other IT tools are susceptible to hacking.

Business models transformation

Fast development of the digital technologies, IoT that has a huge impact on business models and is causing enormous transformations in a lot of industries while leaving others uncompetitive.

6. Forecasts: Financial Statements

Income Statement or P&L (Profit and Losses):

Net Sales

The company's total net sales were $49 109M in 2017 which were composed by sales and services of Innovative Medicines, Sandoz and Alcon divisions.

These Net Sales were divided by region of the world (Figure 14). The Novartis AG. total net sales were forecasted to rise at a CAGR (compound annual growth rate) of 2,36% for the forecasted years. This growth rate is a merge of different GDP growth rates by regions and considering the weight of net sales of these countries in the total net sales of the company (Table 14).

Table 14: Growth Rate forecasted by region
Source: IMF and SC analysis

Country	Novartis Net sales	%	last (g) 3y	Average per Country
Europe	17 492	35,62%	1,6%	0,57%
US	16 935	34,48%	2,2%	0,76%
Asia/Africa	10 718	21,82%	4,2%	0,92%
Canada/Latin America	3 964	8,07%	1,4%	0,11%
World	**49 109**	100,00%	3,3%	**2,36%**

Innovative Medicines:

To make projections about this item of the income statement, one of the most important, I had to look a little deeper to the pipeline of the products of the company and understand which products have more and less weights, which products are close of the patent expiration, which products have potential to be the next blockbuster of Novartis AG and so on.

If we take a look on the historical Innovative Medicines net sales we can conclude the past blockbusters drugs, Gleevec and Lucentis, they had a decline in net sales (table 15 and Table 16) and so on in growth rate of them (Table 15 and Table 16) since 2016 and 2015, respectively. It is expected that the trend of these medicines net sales continue until the next few years, since in 2016 Gleevec patent expired and 2020 Lucentis patent will expire.

According news published by Reuters (January, 24th) from Novartis executives the potential next blockbuster in the near future are Consentyx, Entresto and other new drugs launched since 2014 and 2015. Consentyx is from Immunology and Dermatology area of medicine and has had remarkable results in what concerns to the psoriasis and psoriatic arthritis inflammation. This success is visible in the net sales of this drug, with a growth rate in the last year of 4.22% (Table 15 and Table 16), being the second drug with more weight in the total net sales of Innovative Medicines. Entresto had an huge potential to become one of the next blockbuster due to the specifications of this medicine in heart failures. The life of these medicines starts after 2014 so they have an huge potential to growth in the next years (Appendix I).

These are the main assumptions that I take to forecast the net sales of Innovative Medicines since more than 60% of the net sales become from this division I had to go deeper in my research on the projections of the company to each medicine.

Table 15: Innovative Medicines weights of historical net sales
Source: SC analysis

	FY 2014	FY 2015	FY 2016	FY 2017
IM:	60,65%	67,45%	67,11%	67,25%
Gleevec	9,05%	9,42%	6,85%	3,96%
Lucentis	4,66%	4,17%	3,78%	3,84%
Consentyx		0,53%	2,32%	**4,22%**
Gilenya	4,73%	6,29%	6,41%	6,49%
Galvus	2,34%	2,31%	2,54%	2,43%
Entresto		0,04%	0,35%	**1,03%**
- Promacta		0,81%	1,31%	1,77%
-Tafinlar		0,92%	1,39%	1,78%
-Others	39,88%	42,96%	42,16%	41,74%

Table 16: Innovative Medicines historical net sales
Source: SC analysis

	FY 2014	FY 2015	FY 2016	FY 2017
IM:	31 791	33 345	32 562	33 025
Gleevec	4 746	4 658	3 323	1 943
Lucentis	2 441	2 060	1 835	1 888
Consentyx		261	1 128	2 071
Gilenya	2 477	3 109	3 109	3 185
Galvus	1 224	1 140	1 233	1 193
Entresto		21	170	507
Promacta		402	635	867
Tafinlar		453	672	873
Others	20 903	21 241	20 457	20 498

Sandoz and Alcon:

Sandoz and Alcon, due to the lower weight on the net sales (Figure 26) I based my calculations for their net sales on the average of historical weights of each division in the total net sales. As we can see in the figure 26, last year Alcon had an weight in the total net sales of 12%, Sandoz 21% and Innovative Medicines 67% (Figure 26).

The Appendix I contains more detail about the net sales forecast to each product of the company pipeline and from each division of the business.

Cost of Goods Sold (COGS), R&D, Marketing & Sales and Other expenses

For these Income Statement items (expenses with an weight of more than 15% of the total net sales) I made an assumption of more efficiency in general. In terms of cost of goods sold I believe that it will be increase in line with the increase of net sales (Table 17). With the innovation of technologies stated above, the research and development of new medicines is now faster than ever and more animal friendly, for example, since the animal tests are being replicable in robots. With the advance of innovation through, for example, new innovative ways to do marketing & sales in pharmaceuticals with robotic and big data analysis they can reach faster potential clients and close businesses. The remain expenses had a less weight (Table 17) in the total net sales so the forecast of them are calculate through the average historical weight to sales.

Since pharmaceuticals spend a lot in R&D it is good to take a look on return on research capital ratio (RORC). The general formula used for compute this ratio is:

$$RORC = \frac{Current\ Year\ Gross\ Profit}{Previous\ Year\ R\&D\ expenditures}$$

This ratio gives us an idea of how successfully the company is working to transform the previous year R&D expenditures into current year gross profit. On table 18 are the historical and forecasted RORC, for examples, for every $1 Novartis Company spent on Research and Development, they achieved a return of $3.65 in gross profit (2017).

Balance Sheet:

Assets

Goodwill

Due to the newest acquisition by Novartis AG of the AveXis gene therpy that would be closed at the end of this year, the forecast of the goodwill wouldn't be stable. So due to the projections of the company in bets the number one pharmaceutical in gene therapy, I predicted a growth over the next years.

Accounts Receivable

To forecast the first item to be forecasted of the working capital, I've calculated the historical Accounts Receivables turnover ratio (A/R) that measures how efficient a company can be in the use of its assets in each period of one year.

The general formula used to compute this ratio was:

$$AR\ turnover\ ratio = \frac{Sales(t)}{\frac{Accounts\ Receivable(t) + Accounts\ Receivable(t-1)}{2}}$$

And with this ratio I've calculated the number of days sales outstanding (DSO) that means how long it takes to Novartis AG collect its receivables(Table 19).

The general formula used to compute this ratio was:

$$DSO = \frac{365}{Accounts\ receivable\ turnover\ ratio}$$

After the historical ratio calculated I used this ratio to predict the future Accounts Receivables item in the Balance Sheet.

Figure 26: Net sales by division
Source: SC analysis

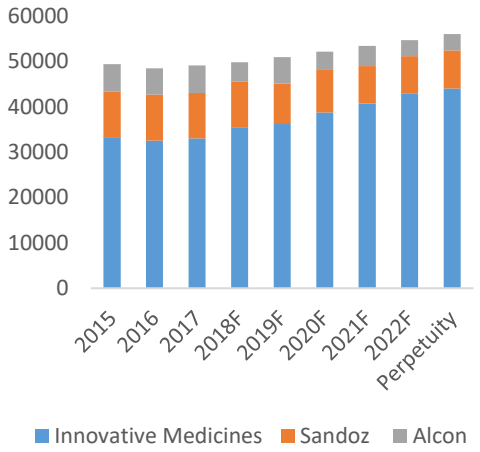


Table 17: COGS in Net Sales
Source: SC analysis

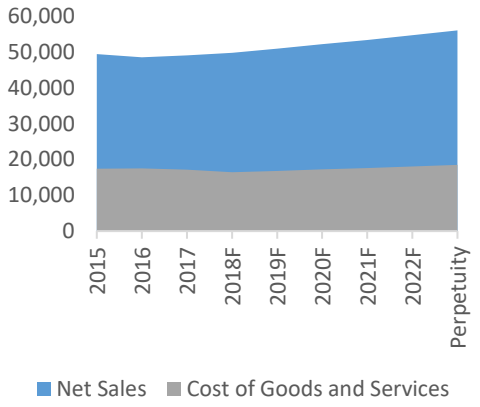


Table 18: RORC historical
Source: SC analysis

2015	2016	2017	2018F	2019F
363%	**357%**	**365%**	**383%**	**415,82%**

Table 19: A/R and Number of days outstanding
Source: SC analysis

	Historical average
A/R	5,72
DSO	63,99

Inventories

Inventory was forecasted in a similar way to accounts receivables, but instead of using A/R turnover ratio I used Inventory turnover ratio that measures how many times an inventory is sold in a period of one year.

The general formula used to compute this ratio was:

$$Inventory\ turnover\ ratio = \frac{COGS(t)}{\frac{Inventories(t) + Inventories(t-1)}{2}}$$

And with this ratio I've calculated the number of days of inventory on hand(DIH) that means how long it takes to Novartis AG to sell his inventory(Table 20).

The general formula used to compute this ratio was:

$$DIH = \frac{365}{Inventory\ turnover\ ratio}$$

After the historical ratio calculated I used this ratio to predict the future Inventory item in the Balance Sheet.

Remain assets items

The remain forecasted accounts of assets were calculated through an average growth rate of the last 7 years and their weight on total assets. Some items were calculated in the same way but with an average of less years than the historical, due to the acquisition of Glaxo Oncology in 2014 that I assume an outlier in these growth rates.

Liabilities

Accounts Payables

To forecast this account the method that I used was quite similar to the accounts receivables. I've calculated the historical Accounts Payables turnover ratio (A/P) that measures how many times a company can pay its payables in each period of one year.

The general formula used to compute this ratio was:

$$AP\ turnover\ ratio = \frac{COGS(t)}{\frac{Accounts\ Payables(t) + Accounts\ Payables(t-1)}{2}}$$

And with this ratio I've calculated the number of days of payables (DOP) that means how long it takes to Novartis AG pay back to his vendors (Table 21).

The general formula used to compute this ratio was:

$$DOP = \frac{365}{Accounts\ Payables\ turnover\ ratio}$$

After the historical ratio calculated I used it to predict the future Accounts Payables item in the Balance Sheet.

Analyzing the average of days sales outstanding and days of payables we can conclude that Novartis AG. can reach a good leverage due to the fact of days of payables are almost twice of days of receivables. So the sellers are financing the activity of Novartis AG (Figure 27).

Table 20: I/R and DIH
Source: SC analysis

	Historical average
I/R	2,70
DIH	136,50

Table 21: A/P and DOP
Source: SC analysis

	Historical average
A/P	3,21
DOP	114,54

Figure 27: DSO, DIH and DOP
Source: SC analysis

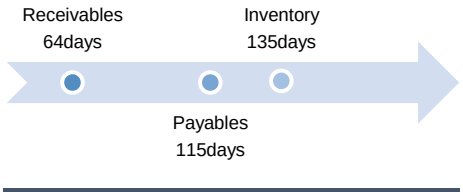


Figure 28: Short-term debt to total debt
Source: SC analysis

$$= \frac{financial\ debts\ and\ derivatives}{total\ debt}$$

Figure 29: Debt-to-equity ratio
Source: SC analysis

$$= \frac{Short\ term\ debt + Long\ term\ debt}{Total\ Equity}$$

Figure 30: Net Debt
Source: SC analysis

$$= Total\ debt - (Cash\ and\ Cash\ equivalents + Short\ term\ investments)$$

Debt

Forecast future debt could be kind of hard since changes of this item are mostly driven by unpredictable management choices. Adding to this, hedging contracts to protect the fixed and floating debt rate that are denominated in many currencies, are also unpredictable. Mostly of derivatives of Novartis AG contracts are forward foreign exchange rate contracts.

Novartis AG. balance sheet is financed with **financial short-term debts (**as commercial paper) which matures in 90 days and long-term debt. Novartis AG. debt is a mix of fixed rate and variable rate financial debt denominated in many currencies.

To forecast the future debt I take a simplistic approach. First of all I assume that short-term debt will move in the same way in the future, due this, the ratio shot-term to total debt (figure 28) will equal the historic average. Next, I assume that the Novartis AG. pay downs will be substituted new debt, but then I make the assumption the debt-to-equity ratio will be consistent with the historical average (figure 29). This lastly assumption it is very important because makes the debt to grow with the balance sheet, so after I made the calculation of every components of the total debt. After this, I've made the calculation of Net Debt (Figure 30). Observing Table 22 and having in mind the company's strategy of consistent credit rating quality, is foreseen that the net debt will decline the next years and then become more stable later.

Table 22: Net Debt Forecast
Source: SC analysis

Year	Net Debt
2015	16 484
2016	16 025
2017	19 047
2018*F*	17 639
2019*F*	17 374
2020*F*	18 110
2021*F*	18 892
2022*F*	20 125
Perpetuity	21 481

Cash Flow Statement:

Capital Expenditures (CapEx)

Capital Expenditures are the capital resources used by Novartis AG. to purchase of property, plant and equipment frequently used to investing in new projects and the maintenance of the infra-structures. The company's strategy is to make best use of their structures to keep serving the business and improving it to keep following the innovation of things. Concerning the historical purchase of property, plant and equipment we can conclude that the values of CapEx are very consistent and steady through the years. Also I assume in the first forecasted year an increase due the fact of acquisition of AveXis deal of Gene therapy by Novartis AG. This will bring synergies in 2018 and 2019, from this last year the CapEx remain stable. Due this, for forecasted years I've assumed similar values pondered by the growth rate from 2019.

Depreciation & Amortization

To forecast this item I follow some steps. First of all I had to compute the average historical weight of depreciation and amortization expense in the total of property, plant and equipment and intangible assets. After this, I only had to calculate the Depreciation & amortization by using the historical average growth rate times the prior year property, plant and equipment item and intangibles.

Net Working Capital (NWC)

The general formula used to compute the Changes in Net Working Capital was:

$$\begin{aligned} &\boldsymbol{Changes\ in\ NWC} \\ &\quad = \boldsymbol{Changes\ in\ accounts\ receivable} + \boldsymbol{\ Changes\ in\ Inventories} \\ &\quad + \boldsymbol{Changes\ in\ Accounts\ Payables} \\ &\quad + \boldsymbol{Changes\ in\ Other\ Operating\ Assets\ or\ Liabilities} \end{aligned}$$

More detailed information about all these items can be seen in Appendix L.

7. Valuation

To make my evaluation I've used two methods, **Discounted Cash Flow** as the principal method, and **Multiples valuation**.

Discounted Cash Flow (DCF):

Through the Discounted Cash Flow model I've computed a **price target** of $89.52 for the end of 2018, resulting on a price **upside potential** of 4.44% (Table 23). Due this result we can conclude that Novartis AG is at this time undervalued, but because the upside potential is inferior to 10%, my recommendation is to **Reduce.**

More detail about these processes of Discounted Cash Flow valuation available in Appendix L.

Initially, to do the DCF valuation I had to compute **the Free Cash Flow To the Firm (FCFF)** and also the **weighted average cost of capital (WACC)**. The free cash flow to the firm is the available value of cash flow from the companies' operational business after operational expenses like depreciations, taxes and working capital. The weighted average cost of capital was computed as a rate of return of Novartis AG in other words, the cost of capital of the company and the return of the investors.

To compute the FCFF the first step taken was computed earnings before interest and taxes or operating income (EBIT) by subtracting to the revenues COGS and operating expenses (Figure 31 and Table 24).

Table 24: EBIT Forecast
Source: SC analysis

	2017FY	2018F	2019F	2020F	2021F	2022F	Perp.
Sales	49 109	49 805	50 980	52 182	53 413	54 672	56 061
COGS	17 175	16 436	16 823	17 220	17 626	18 042	18 500
Oper. Exp.	23 305	22 835	23 374	23 925	24 489	25 067	25 703
EBIT	8 629	10 783	10 783	11 037	11 297	11 564	11 857

To compute the FCFF for forecasted years I've used the general formula:

$$\boldsymbol{FCFF = EBIT \times (1 - Marginal\ Tax\ Rate) + D\&A - Changing\ in\ WC - CapEx}$$

You can see with more detail the forecasted FCFF in the following table:

Table 25: EBIT Forecast
Source: SC analysis

	2017FY	2018F	2019F	2020F	2021F	2022F	Perp.
EBIT	14 705	15 840	15 882	15 956	16 059	16 190	16 601
Interest	777	711	730	750	770	791	811
D&A	6 076	5 306	5 100	4 919	4 762	4 627	4 744

Table 23: DCF analysis
Source: SC analysis

Enterprise value	214 647
Net Debt	17 639
Shares Outstanding	2 386
Price Target (2018 Dec, 31th)	$89.52
Upside Potential	4.44%
Current Price	$85.72

Figure 31: EBIT
Source: SC analysis

NWC	244	189	192	195	198	201	206
CapEx	1 696	2 477	2 535	2 595	2 656	2 719	2 788
FCFF	11 590	11 554	11 436	11 313	11 178	11 026	11 306

Table 26: Equity Risk Premium
Source: Damodaran

U.S.	5.08%
Western Europe	6.39%

Table 27: DCF Main Assumptions
Source: SC analysis

risk free rate	2.20%
ERP	6.34%
B_l	1,21
K_e	7.23%
K_d	2.42%
tax rate	14%
weight of debt	11.73%
weight of equity	88.27%
WACC	6.63%

Main Assumptions:

Period of valuation

In this case, the time period considered was five years, from 31st of December 2017 to 31st of December 2022. After this date, I assume perpetuity time.

Discount Rate

After the FCFF computed, I've to compute the discount rate, as I talked above, Weighted Average Cost of Capital rate.

To calculate the actual WACC I've used the general formula:

$$WACC = K_e \times \frac{E}{E+D} + K_d \times \frac{D}{E+D} \times (1-t)$$

$K_e: cost\ of\ equity$

$K_d: cost\ of\ debt$

$E: Equity$

$D: Net\ Debt$

$t: tax\ rate$

The weighted average cost of capital is divided in many components that must be considered.

In the first side of the WACC formula I had to compute the **Cost of Equity (K_e).** To reach them I based my calculations on **Capital Asset Price Model (CAPM).** The cost of equity represents the return on investing in the company, to the stockholders side. The following general formula is the one that I've used to compute cost of equity:

$$K_e = R_f + \beta_e \times ERP$$

$R_f: Risk - free\ rate$

$\beta_e: Beta\ coefficient\ (unsystematic\ risk)$

$ERP: Equity\ Risk\ Premium$

To the first side of the formula, **Risk Free Rate (R_f)** I used the 10-year U.S. Treasury Bond Rate, considering a safety investment and where the company had almost half of their business. The risk free that I used was 2.20% at 2017 19th of September.

To the **Equity Risk Premium (ERP)**, I used the available ERP on Damodaran considering an average between United States ERP and Europe countries where Novartis AG. Works (Table 26). So, the average ERP value used for my calculations was 6.34%.

Finally, to compute the Levered Beta for WACC calculations I've used the following formula:

$$B_l = B_u \times \left(1 + \frac{D}{E} \times (1 - t)\right)$$

B_u: $unlevered\ Beta$

t: $tax\ rate$

The component of unsystematic risk that I used was of the Damodaran as well and for the pharmaceutical industry. The value of β_u that I've used was 1.09. Since reaching this value I'm able to compute the Levered Beta. The value of my calculations of levered Beta was 1.21.

I've reached at the end, a **Cost of Equity** of 7.23%.

After computed the cost of equity based on assumptions above, I had to determine the **Cost of Debt (K_d).** For this purpose I've used the YTM (yield to maturity) approach. Since the Novartis AG. is a public company I just had to divided the amount of debt times YTM by total public debt of the company. That way, I've assumed an average YTM of 2.42%. This value is in line with the Novartis AG investment grade A1 (Moody's).

With **Free Cash Flows to the Firm (FCFF)** and **WACC** rate computed I'm able to calculate the **Terminal Value (TV)** through the following formula:

$$TV = \frac{FCFF \times (1 + g)}{WACC - g}$$

g: $perpetual\ growth\ rate$

Regarding the assumption that the perpetual growth rate should represent a GDP growth at the end of forecasted period, I considered, to the **Perpetual Growth Rate** ($\boldsymbol{g}$) an average of the World Real GDP Growth Rate weighted by each percentage of Novartis AG. sales in those countries.

Multiples Valuation:

Other valuation that I considered in my forecast was **Multiples Approach.** This approach was taken in order to complement the reached price target with DCF. The multiples that I've considered were Price to Book (P/B), Price to Sales (P/Sales) and Enterprise Value to EBITDA (EV/EBITDA).

Price to Book (P/B)

To compute this multiple I've used the following formula:

$$P/B = \frac{Market\ Price\ per\ Share}{Book\ Value\ per\ Share}$$

So I took into account the mean of this multiple on the last two years for Novartis AG. and Peers and based on that I've forecasted a price target of $96,31 that represents an upside potential of 12% (Table 28).

Table 28: Price to Book Multiple
Source: SC analysis

	2018F
Multiple	3.01
Book value	32
Price Target	$96.31
Current Price	$85.72
Upside Potential	12%

Table 29: Price to Sales Multiple
Source: SC analysis

	2018F
Peers Multiple	4.18
Revenues	50 832
Shares Outstanding	2 386
Price Target	$89.08
Current Price	$85.72
Upside Potential	4%

Table 30: EV/EBITDA
Source: SC analysis

	2018F
EBITDA NVS	15 840
Peers multiple	14.74
NVS Enterprise Value by Peers	233 507
Net Debt	17 639
Equity Value by Peers	215 867
Price target	$90.49
Current Price	$85.72
Upside Potential	6%

Price to Sales (P/Sales)

To compute this multiple I've used the following formula:

$$P/Sales = \frac{Price}{Revenues/Share}$$

So I took into account the mean of this multiple on the last two years for Novartis AG. and Peers and based on that I've forecasted a price target of $89.08 that represents an upside potential of 4% (table 29).

Enterprise Value to EBITDA (EV/EBITDA)

To compute this multiple I've used the following formula:

$$EV/EBITDA = \frac{Enterprise\ Value}{EBITDA}$$

So I took into account the mean of this multiple on the last two years for Novartis AG. and Peers and based on that I forecasted a price target of $90.49 which represents an upside potential of 6% (Table 30).

The results provided from multiples approach are in line with DCF approach and supports, once again, the recommendation to **Reduce.** This result is quite similar to the DCF approach, with an upside potential variation of 2.84% from DCF to Multiples approach (Table 31).

Main Assumptions:

I had to apply some conditions to choose the best peers, the companies that lookalike more to Novartis AG. I based my conditions in the size of the companies in terms of sales size, Maket Capitalization size, total assets size and EBIT size (Table 32). More detail about the Peers choices can seen on Appendix M.

On Table 33 you can observe the results of the multiples for each Peer and Novartis AG to find a better way to compare them.

Table 33: Peers multiples results

Source: SC Analysis

Companies	EV/EBITDA	P/B	P/Sales
Novartis AG	14.72	2.48	3.73
Pfizer Inc.	12.29	3.17	3.93
Sanofi	10.43	1.63	2.67
Merck	15.49	4.23	3.96
Price Target	$90.49	$96.31	$89.09

From both approaches, DCF and multiples, the conclusion remains the same, Novartis AG. is **undervalued** (Figure 32), my recommendation still is to **Reduce.**

Table 31: Multiples Results

Source: SC analysis

	2018F
EV/EBITDA	$90.49
P/B	$96.31
P/Sales	$89.08
Average Price Target	$91.96
Current Price	$84.63
Upside Potential	7.28%
Price Target from DCF	$89.52
Upside Potential from DCF	4.44%

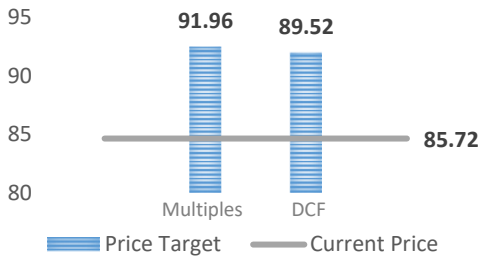
Table 32: Peer Analysis

Source: SC Analysis

Companies	Peer Selection
Johnson & Johnson	NOT PEER
Pfizer Inc.	PEER
Sanofi	PEER
Merck	PEER
Brystol Myers.	NOT PEER
Eli Lilly	NOT PEER

Figure 32: Price Target

Source: SC Analysis



8. Financial Analysis Resume

Income Statement

In what concerns to P&L(profit & losses) we can observe an increase through the forecasted years in **Net Income** and in **EBIT** and **EBITDA** as well (Figure 33). The main reason of this increase is due the fact of my assumptions, like an increase in revenues explained with more detail in this work on "5. Forecasts: Financial Statements".

When we take a look in the **CapEx** we can observe an increase in the first forecasted year because my assumption of the newest acquisition of AveXis deal of Gene therapy by Novartis AG. that will bring synergies in 2018 and 2019 and from this last year forward the CapEx remain stable.

Observing future Net Income (Figure 34) it seems these values are reasonable when compared with the historical data (Appendix B).

Novartis AG. is a mature firm, very well established in the pharmaceutical industry, with a reputation of years that brings loyal clients, and stable results.

Some key ratios of profitability like EBITDA Margin registered and increase of 2% on the first forecasted year while EBIT Margin registered an increase of 3%. Future EBITDA Margin value for future is predictable to be within the range from 30% to 31% and EBITDA Margin will remain on 21% (Figure 34).

Naturally, in terms of COGS we can observe an increase as well mainly due the fact of the increase in revenues like I've talked above in this work. COGS in the forecasted years will have an weight of 33% in the total of Net Sales and R&D and Marketing & Sales expenses will have an weight of 41% in the total of Net Sales

Equity Ratio

In terms of equity ratio we can observe this ratio will remain stable from 2015 to the forecasted year that means each shareholder will maintain their residual claim in amount of assets. Debt to equity ratio seems to be consistent with this theory since we can observe a decrease only of 0.01 (from 0.77 to 0.76) for forecasted years. Debt to equity ratio has been stable in the historical years and it is presumed that remain stable. Due the fact of this variations of the solvency ratios are really small we can assume that the solvency policy of the company will remain the same.

Return on Equity (ROE)

In 2015 and 2016 the ROE ratio had a deeply decrease from 15% in 2014 to 9% in 2015 and 2016. In 2017 the return on equity starts to grow again. These values of 2015 and 2016 are explained by the decrease on Net Sales in both years. This decrease is explained by the patent expiration of two top line medicines of Novartis AG. and generic competition of them. Novartis AG. has new top products launched that starts to grow in 2017 and its predictable to increase net sales a lot. So, I predict an increase of ROE of 2% in the next years (Figure 35).

Return on Assets (ROA)

The performance of this ratio is in the same line of ROE, with a decrease in 2015 and 2016. The explanation is the same (Figure 35).

More key ratios can be seen at Appendix H.

Figure 33: P&L Forecast
Source: SC analysis

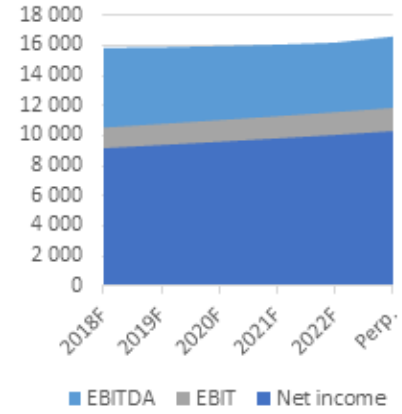


Figure 34: Profitability Ratios
Source: SC analysis

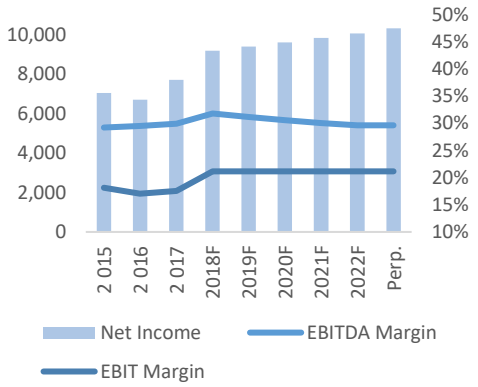
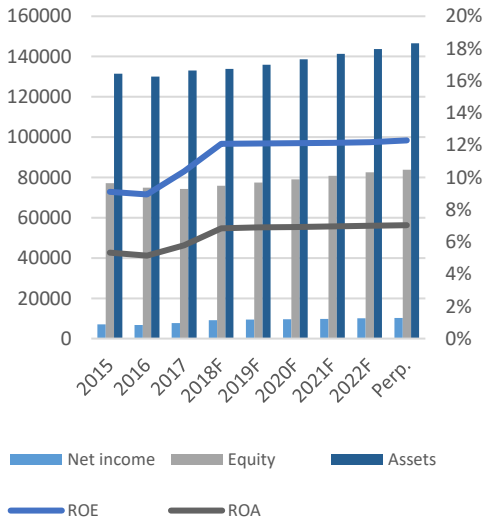


Figure 35: Key Ratios
Source: SC analysis



9. Investments Risks: Risk Assessment

High Impact and Probability (Figure 36)

Pricing

As I talked above, pharmaceutical companies have to face many regulations and limitations that can affect the results. Pharmaceutical industry suffer of pricing pressure from governments and legislation from each country with different patents laws and medicines legislation. The governments and their mission to provide healthcare services to all, providing medicines and services at a very low cost when compared with the cost that pharmaceuticals have to face to produce them, causes an high pressure on prices to these companies like Novartis AG.

It is predictable this situation will continue through the years and obviously it will be reflected in the results of the companies of pharmaceutical industry.

Research & Development

Pharmaceuticals face huge R&D expenses and investments with massive capital requirements and complex procedures and know-how. Novartis AG is in constant projects of R&D since pharmaceuticals have obligation to restock their pipeline of products because the patent expiration from ones means the launch of other different medicines. This situation is cyclical and never ending process to this industry and with no guarantee if their R&D projects are going to be a success or a failure. If it will be a failure, so all the expenses are a sunk cost that don't bring any plus, only costs.

Patent Expiration and Generics increase

The expiration of a patent medicine will bring the competition of generics. When it happens the impact on the revenues of this specific medicine is huge. So when a patent of a blockbuster medicine ends, the company can't count anymore with huge revenues from that product even if is the bigger product of the pipeline.

Medium and Medium-High Impact and Probability (Figure 36)

Novartis AG. revenues and a lot of other items of financial statements of the industry are exposed to the **foreign exchange rates**. Since the company operates all around the world is exposed to many currencies. Novartis AG. uses derivatives contracts to hedge this, like swaps and forward-exchange contracts.

Technology and Biotechnology innovation are challenging the pharmaceutical industries. Novartis AG. is doing very well on that, with many projects in these areas as I talked above.

Regulatory and Legal issues were explained above.

Low and Medium-Low Impact and Probability (Figure 36)

Until now, **alternative therapies and alternative medical devices** don't seem to have a significant impact in this industry. Usually are used as a complement to medical treatments and not as a solution or replacement to the medical treatments.

The risk matrix is represented on Figure 36.

Figure 36: Risk Matrix
Source: SC Analysis

		PROBABILITY				
		High	Medium-High	Medium	Medium-Low	Low
IMPACT	Low					
	Medium-Low					Alternative Therapies and Medical Devices
	Medium		Technologic change (Big Data and Data analytics)			
	Medium-High	Pricing	Biotechnology	Change exchange rate		
	High	Research & Development	Patent expirations = Generics increase	Regulatory and Legal restrictions		

Sensitivity Analysis:

To determine the impact in the price target of different changes on different important variables of discounted cash flow valuation I've computed a sensitivity analysis to see this impact more clearly.

Different Weighted Average Cost of Capital (WACC)

Since the weighted average cost of capital rate is one of the most important items of the DCF valuation, it is important to know that little changes in this rate means huge changes on the output, price target.

As we can observe on the table below the price target tends to decrease in a large amounts when the WACC rate increase only 1%. So, my recommendation with higher WACC would be to **Sell** instead of hold.

Table 34: Price Target with different Wacc

Source: SC Analysis

Changes in Wacc

	6,63%	7,63%	8,63%	9,63%	10,63%
89,52	**89,52**	**70,55**	**49,13**	**33,63**	**23,97**
Variation	**0,0%**	**-21,2%**	**-45,1%**	**-62,4%**	**-73,2%**

Different Terminal Growth Rate

Changes in the growth rate are directly connected to changes in price target. So, while the growth rate is increasing, the price target as well. So if the growth rate has an increase behaviour above 3% my recommendation would be to **Buy**, if the opposite happen my recommendation would be to **Sell**.

Table 35: Price Target with different Growth Rate

Source: SC Analysis

Changes in Terminal Growth rate

	1,50%	2,00%	2,54%	3,00%	3,50%	4,00%
89,52	**73,51**	**80,31**	**89,52**	**99,53**	**113,76**	**133,40**
Variation	**-18%**	**-10%**	**0%**	**11%**	**27%**	**49%**

Both different Growth Rate and WACC

On the table below we can observe the changes on the price target provided by a match between changes in the growth rate and WACC. So with a growth rate above the actual 2.54% all the output price target are superior. To recommend to **Sell** the growth rate should be higher than 2.54% and WACC a little superior to 6%.

Table 36: Price Target with different Growth Rate and WACC
Source: SC Analysis

Changes in Wacc (Row) and Growth Rate (Column)

89.52	**6.00%**	**6.30%**	**6.63%**	**7.63%**	**8.63%**
1.00%	77.42	72.58	67.92	56.62	48.42
2.00%	94.12	86.99	80.31	64.80	54.13
2.54%	107.16	97.96	**89.52**	70.55	57.99
3.54%	146.41	129.62	115.10	85.22	67.31
4.54%	239.44	197.24	165.19	109.40	81.19

Different Beta

By the observation of table 37, we can conclude that changes in the value of Beta are not significant in what concerns to changes of price target. So, my recommendation would be **Reduce** even if Beta will change.

Table 37: Price Target with different Beta
Source: SC Analysis

Changes in Beta

	0,41	0,71	1,21	1,71	2,01
89,52	88,72	89,02	**89,52**	90,02	90,32
Variation	-0,9%	-0,6%	0,0%	0,6%	0,9%

Different Tax Rate

Differences in the Tax Rate in a range of -2% to 2% are insignificant to the price target since the variation of this in the price target is lower than 1%. So, my recommendation would be **Hold** even if Tax rate will change.

Table 38: Price Target with different Tax Rate
Source: SC Analysis

Changes in Tax Rate

13,51%	**11,51%**	**12,51%**	**13,51%**	**14,51%**	**15,51%**
89,52	**89,50**	**89,51**	**89,52**	**89,53**	**89,54**

Different Tax Rate and Equity Risk Premium

On table 38 we can observe the impact of Beta and Equity Risk Premium in the price target at the same time. As we can see, we have an downside potential to almost all the situations where the Beta is superior to 8,34% and ERP any of the values within a range from 0,71 to 1,71.

Table 39: Price Target with different Beta and ERP

Source: SC Analysis

Changes in Beta (Row) and ERP (column)

	1,21	0,71	1,01	1,41	1,71
6.34%	**89.52**	169.03	254.96	169.03	89.52
7.34%	69.48	130.08	194.13	130.08	69.48
8.34%	47.56	88.06	130.10	88.06	47.56
9.34%	32.18	58.48	85.80	58.48	32.18
10.34%	22.86	40.03	58.23	40.03	22.86

Through this analysis I can conclude that WACC and Growth Rate are the most sensible factors with huge variations in price target, and parameters like Tax Rate and Beta don't have significate variations.

Appendices

Appendix A: Balance Sheet

In Millions of USD except Per Share	Historical			Forecasted Years					
	FY 2015	FY 2016	FY 2017	F2018	F2019	F2020	F2021	F2022	Perpet.
Assets									
Non-Current Assets									
Property, plant & equipment	15 982	15 641	16 464	17 088	17 735	18 407	19 105	19 828	20 332
Goodwill	31 174	30 980	31 750	30 861	33 157	35 662	38 053	41 111	42 156
Intangible assets other than goodwill	34 217	31 340	29 997	27 572	25 342	23 293	21 410	19 679	20 179
Investments in associated companies	15 314	14 304	15 370	15 608	15 850	16 095	16 344	16 597	17 019
Deferred tax assets	8 957	10 034	8 229	8 696	9 190	9 712	10 264	10 847	11 122
Financial assets	2 466	2 196	2 243	2 492	2 768	3 076	3 417	3 796	3 892
Other non-current assets	601	698	818	916	1 026	1 150	1 288	1 443	1 479
Total non-current assets	**108 711**	**105 193**	**104 871**	**103 233**	**105 069**	**107 396**	**109 881**	**113 302**	**116 180**
Current Assets									
Inventories	6 226	6 255	6 867	5 876	6 319	6 164	6 613	6 465	6 629
Trade receivables	8 180	8 202	8 600	8 809	9 011	9 229	9 441	9 670	9 915
Marketable securities, commodities, time deposits and derivative financial instruments	773	770	625	644	663	683	703	725	743
Cash and cash equivalents	4 674	7 007	8 860	9 603	10 045	10 175	10 003	9 398	8 791
Other current assets	2 992	2 541	3 054	5 654	4 894	4 929	4 676	4 156	4 262
Total current assets	**22 845**	**24 931**	**28 208**	**30 586**	**30 932**	**31 180**	**31 436**	**30 413**	**30 341**
Total assets	**131 556**	**130 124**	**133 079**	**133 819**	**136 001**	**138 576**	**141 317**	**143 715**	**146 520**
Equity and liabilities									
Equity									
Share Capital	991	972	969	969	969	969	969	969	969
Treasury shares	-101	-76	-100	-100	-100	-100	-100	-100	-100
Reserves	76 156	73 936	73 299	74 893	76 521	78 185	79 885	81 622	82 872
-Issued share capital and reserves atributable to Novartis AG shareholders	**77 046**	**74 832**	**74 168**	75 762	77 390	79 054	80 754	82 491	83 741
Non-controlling interests	76	59	59	68	70	71	73	75	77
Total equity	**77 122**	**74 891**	**74 227**	**75 830**	**77 460**	**79 125**	**80 827**	**82 565**	**83 817**
Liabilities									
Non-current liabilities									
Financial debts	16 327	17 897	23 224	21 900	22 416	22 945	23 486	24 040	24 650
Deferred tax liabilities	6 355	6 657	5 168	5 290	5 229	5 259	5 244	5 252	5 385
Provisions and other non-current liabilities	8 044	8 470	7 057	7 045	7 034	7 022	7 010	6 999	7 177
Other non-current assets									
Total non-current liabilities	**30 726**	**33 024**	**35 449**	**34 235**	**34 679**	**35 226**	**35 741**	**36 290**	**37 212**
Current Liabilities									
Trade payables	5 668	4 873	5 169	5 075	5 411	5 323	5 664	5 582	5 724
Financial debts and derivative financial instruments	5 604	5 905	5 308	5 986	5 666	6 023	6 112	6 207	6 365
Current income tax liabilities	1 717	1 603	1 723	1 431	1 465	1 499	1 534	1 571	1 611
Provisions and other current liabilities	10 719	9 828	11 203	11 262	11 321	11 380	11 439	11 499	11 791
Total current liabilities	**23 708**	**22 209**	**23 403**	**23 754**	**23 862**	**24 225**	**24 750**	**24 859**	**25 490**
Total liabilities	**54 434**	**55 233**	**58 852**	**57 989**	**58 541**	**59 451**	**60 491**	**61 149**	**62 702**
Total equity and liabilitites	**131 556**	**130 124**	**133 079**	**133 819**	**136 001**	**138 576**	**141 317**	**143 715**	**146 520**

Appendix B: Income Statement

In Millions of USD except Per Share	Historical			Forecasted Years					
	FY 2015	FY 2016	FY 2017	F2018	F2019	F2020	F2021	F2022	Perpet.
Net sales to third parties from continuing operations	49 414	48 518	49 109	49 805	50 980	52 182	53 413	54 672	56 061
Innovative Medicines Net Sales:	33 345	32 562	33 025	35 472	36 207	38 720	40 733	42 957	44 048
-Gleevec/Glivec (Oncology)	4 658	3 323	1 943	1 893	1 784	1 696	1 549	1 367	1 402
-Lucentis (Ophthalmology)	2 060	1 835	1 888	1 793	1 529	1 513	1 442	1 312	1 345
-Consentyx (Immunology and Dermatology)	261	1 128	2 071	2 341	2 549	2 870	4 006	4 510	4 625
-Gilenya (Neuroscience)	3 109	3 109	3 185	3 337	3 467	3 548	3 472	3 280	3 364
-Galvus (Established Medicines)	1 140	1 233	1 193	1 295	1 274	1 372	1 357	1 531	1 570
-Entresto (Cardio-Metabolic)	21	170	507	1 743	2 141	2 870	3 579	4 100	4 205
-Promacta/Revolade (Oncology)	402	635	867	1 096	1 325	1 565	1 869	2 187	2 242
-Tafinlar/Mekinist (Oncology)	453	672	873	1 096	1 274	1 409	1 602	1 750	1 794
-Others	21 241	20 457	20 498	20 879	20 862	21 876	21 857	22 919	23 502
Sandoz	10 070	10 144	10 060	10 033	8 864	9 423	8 241	8 201	8 409
Alcon	5 999	5 812	6 024	4 300	5 909	4 039	4 438	3 515	3 604
Sales to discontinues segments	26	0	0	0	0	0	0	0	0
Net sales from continuing operations	**49 440**	**48 518**	**49 109**	**49 805**	**50 980**	**52 182**	**53 413**	**54 672**	**56 061**
Other revenues	947	918	1 026	1 027	1 051	1 075	1 101	1 127	1 155
Revenues	**50 387**	**49 436**	**50 135**	**50 832**	**52 030**	**53 257**	**54 513**	**55 799**	**57 216**
Cost of goods sold	-17 404	-17 520	-17 175	-16 436	-16 823	-17 220	-17 626	-18 042	-18 500
Gross profit from continuing operations	**32 983**	**31 916**	**32 960**	**34 396**	**35 207**	**36 037**	**36 887**	**37 757**	**38 716**
Marketing & Sales	-11 772	-11 998	-12 861	-12 451	-12 745	-13 045	-13 353	-13 668	-14 015
Research & Development	-8 935	-9 039	-8 972	-8 467	-8 667	-8 871	-9 080	-9 294	-9 530
General & Administration	-2 475	-2 194	-2 136	-2 428	-2 485	-2 543	-2 603	-2 665	-2 732
Other income	2 049	1 927	1 969	1 834	1 877	1 922	1 967	2 013	2 064
Other expenses	-2 873	-2 344	-2 331	-2 350	-2 405	-2 462	-2 520	-2 580	-2 645
Operating income from continuing operations	**8 977**	**8 268**	**8 629**	**10 534**	**10 783**	**11 037**	**11 297**	**11 564**	**11 857**
EBIT (Earnings Before Interest and Taxes)	**8 977**	**8 268**	**8 629**	**10 534**	**10 783**	**11 037**	**11 297**	**11 564**	**11 857**
Income from associated companies (Affiliate/Joint Ventures)	266	703	1 108	999	1 022	1 046	1 071	1 096	1 124
Interest expense	-655	-707	-777	-711	-730	-750	-770	-791	-811
Other financial income and expense	-454	-447	39	-223	-229	-234	-239	-245	-251
Income before taxes from continuing operations	**8 134**	**7 817**	**8 999**	**10 599**	**10 846**	**11 099**	**11 358**	**11 623**	**11 919**
Taxes (Income tax expenses - benefits)	-1 106	-1 119	-1 296	-1 431	-1 465	-1 499	-1 534	-1 571	-1 611
Net income from continuing operations	**7 028**	**6 698**	**7 703**	**9 168**	**9 382**	**9 600**	**9 824**	**10 053**	**10 308**
Net income	**7 028**	**6 698**	**7 703**	**9 168**	**9 382**	**9 600**	**9 824**	**10 053**	**10 308**

Appendix C: Income Statement by Division

	Historical															
	FY2015					FY 2016					FY 2017					
	Innovative Medicines	*Sandoz*	*Alcon*	*Corporate*	**Group**	*Innovative Medicines*	*Sandoz*	*Alcon*	*Corporate*	**Group**	*Innovative Medicines*	*Sandoz*	*Alcon*	*Corporate*	**Group**
Net sales to third parties	**33 345**	**10 070**	**5 999**	**0**	**49 414**	**32 562**	**10 144**	**5 812**	**0**	**48 518**	**33 025**	**10 060**	**6 024**		**49 109**
Net sales	**33 863**	**10 198**	**5 999**	**-620**	**49 440**	**33 186**	**10 248**	**5 812**	**-728**	**48 518**	**33 693**	**10 178**	**6 027**	**-789**	**49 109**
Other revenues	792	25	23	107	947	815	37	4	62	918	898	37	3	88	1 026
Revenues	**34 655**	**10 223**	**6 022**	**-513**	**50 387**	**34 001**	**10 285**	**5 816**	**-666**	**49 436**	**34 591**	**10 215**	**6 030**	**-701**	**50 135**
Cost of goods sold	-9 204	-5 844	-3 145	789	-17 404	-9 331	-5 971	-3 092	874	-17 520	-9 007	-5 800	-3 231	863	-17 175
Gross Profit	**25 451**	**4 379**	**2 877**	**276**	**32 983**	**24 670**	**4 314**	**2 724**	**208**	**31 916**	**25 584**	**4 415**	**2 799**	**162**	**32 960**
Marketing & Sales	-8 430	-1 679	-1 663	0	-11 772	-8 435	-1 681	-1 882	0	-11 998	-9 089	-1 811	-1 961	0	-12 861
Research & Development	-7 685	-782	-468	0	-8 935	-7 709	-814	-516	0	-9 039	-7 630	-774	-568	0	-8 972
General & Administration	-1 031	-346	-450	-648	-2 475	-978	-300	-410	-506	-2 194	-986	-315	-383	-452	-2 136
Other income	1 149	109	54	737	2 049	1 091	185	48	603	1 927	1 027	204	47	691	1 969
Other expense	-1 639	-381	-69	-784	-2 873	-1 213	-259	-96	-776	-2 344	-1 124	-351	-124	-732	-2 331
Operating income	**7 815**	**1 300**	**281**	**-419**	**8 977**	**7 426**	**1 445**	**-132**	**-471**	**8 268**	**7 782**	**1 368**	**-190**	**-331**	**8 629**
EBIT (Earnings Before Interest and Taxes)	**7 815**	**1 300**	**281**	**-419**	**8 977**	**7 426**	**1 445**	**-132**	**-471**	**8 268**	**7 782**	**1 368**	**-190**	**-331**	**8 629**
Income from associated companies	0	2	0	264	266	0	6	0	697	703	-1	23	0	1 086	1 108
Interest expense				-655	-655					-707				-777	
Other financial income expense				-454	-454					-447				39	
Income before taxes					**8 134**					**7 817**					**8 999**
Taxes					-1 106					-1 119					-1 296
Net income from continuous operations					**7 028**					**6 698**					**7 703**

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	Forecasted Years														
	FY 2018					FY2019					FY 2020				
	Innovative Medicines	*Sandoz*	*Alcon*	*Corporate*	**Group**	*Innovative Medicines*	*Sandoz*	*Alcon*	*Corporate*	**Group**	*Innovative Medicines*	*Sandoz*	*Alcon*	*Corporate*	**Group**
Net sales to third parties	**33 493**	**10 203**	**6 109**	**0**	**49 805**	**34 283**	**10 443**	**6 253**	**0**	**50 980**	**35 092**	**10 689**	**6 401**	**0**	**52 182**
Net sales	**34 171**	**10 322**	**6 112**	**-800**	**49 805**	**34 977**	**10 566**	**6 257**	**-819**	**50 980**	**35 801**	**10 815**	**6 404**	**-838**	**52 182**
Other revenues	898	37	3	88	1 027	920	38	3	90	1 051	941	39	3	92	1 075
Revenues	**35 069**	**10 359**	**6 115**	**-712**	**50 832**	**35 896**	**10 604**	**6 260**	**-729**	**52 030**	**36 743**	**10 854**	**6 407**	**-746**	**53 257**
Cost of goods sold	-8 619	-5 550	-3 092	826	-16 436	-8 823	-5 681	-3 165	845	-16 823	-9 031	-5 815	-3 239	865	-17 220
Gross Profit	**26 450**	**4 809**	**3 024**	**114**	**34 396**	**27 074**	**4 922**	**3 095**	**116**	**35 207**	**27 712**	**5 038**	**3 168**	**119**	**36 037**
Marketing & Sales	-8 799	-1 753	-1 899	0	-12 451	-9 007	-1 795	-1 943	0	-12 745	-9 219	-1 837	-1 989	0	-13 045
Research & Development	-7 200	-730	-536	0	-8 467	-7 370	-748	-549	0	-8 667	-7 544	-765	-562	0	-8 871
General & Administration	-1 121	-358	-435	-514	-2 428	-1 147	-366	-446	-526	-2 485	-1 174	-375	-456	-538	-2 543
Other income	957	190	44	644	1 834	979	194	45	659	1 877	1 002	199	46	674	1 922
Other expense	-1 133	-354	-125	-738	-2 350	-1 160	-362	-128	-755	-2 405	-1 187	-371	-131	-773	-2 462
Operating income	**9 500**	**1 670**	**-232**	**-404**	**10 534**	**9 724**	**1 709**	**-237**	**-414**	**10 783**	**9 954**	**1 750**	**-243**	**-423**	**11 037**
EBIT (Earnings Before Interest and Taxes)	**9 500**	**1 670**	**-232**	**-404**	**10 534**	**9 724**	**1 709**	**-237**	**-414**	**10 783**	**9 954**	**1 750**	**-243**	**-423**	**11 037**
Income from associated companies	-1	21	0	979	999	-1	21	0	1 002	1 022	-1	22	0	1 026	1 046
Interest expense					-711					-730					-750
Other financial income expense					-223					-229					-234
Income before taxes					**10 599**					**10 846**					**11 099**
Taxes					-1 431					-1 465					-1 499
Net income from continuous operations					**9 168**					**9 382**					**9 600**

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	Forecasted Years														
	FY 2021					FY2022					Perpetuity				
	Innovative Medicines	*Sandoz*	*Alcon*	*Corporate*	**Group**	*Innovative Medicines*	*Sandoz*	*Alcon*	*Corporate*	**Group**	*Innovative Medicines*	*Sandoz*	*Alcon*	*Corporate*	**Group**
Net sales to third parties	**35 919**	**10 942**	**6 552**	**0**	**53 413**	**36 766**	**11 200**	**6 706**	**0**	**54 672**	**37 700**	**11 484**	**6 877**	**0**	**56 061**
Net sales	**36 646**	**11 070**	**6 555**	**-858**	**53 413**	**37 510**	**11 331**	**6 710**	**-878**	**54 672**	**38 463**	**11 619**	**6 880**	**-901**	**56 061**
Other revenues	964	40	3	94	1 101	986	41	3	97	1 127	1 011	42	3	99	1 155
Revenues	**37 609**	**11 110**	**6 558**	**-764**	**54 513**	**38 496**	**11 372**	**6 713**	**-782**	**55 799**	**39 474**	**11 660**	**6 884**	**-802**	**57 216**
Cost of goods sold	-9 244	-5 952	-3 316	886	-17 626	-9 462	-6 093	-3 394	907	-18 042	-9 702	-6 247	-3 480	930	-18 500
Gross Profit	**28 366**	**5 157**	**3 243**	**122**	**36 887**	**29 034**	**5 279**	**3 319**	**125**	**37 757**	**29 772**	**5 413**	**3 403**	**128**	**38 716**
Marketing & Sales	-9 437	-1 880	-2 036	0	-13 353	-9 659	-1 925	-2 084	0	-13 668	-9 905	-1 974	-2 137	0	-14 015
Research & Development	-7 722	-783	-575	0	-9 080	-7 904	-802	-588	0	-9 294	-8 105	-822	-603	0	-9 530
General & Administration	-1 202	-384	-467	-551	-2 603	-1 230	-393	-478	-564	-2 665	-1 261	-403	-490	-578	-2 732
Other income	1 026	204	47	690	1 967	1 050	209	48	707	2 013	1 077	214	49	724	2 064
Other expense	-1 215	-379	-134	-791	-2 520	-1 244	-388	-137	-810	-2 580	-1 276	-398	-141	-831	-2 645
Operating income	**10 188**	**1 791**	**-249**	**-433**	**11 297**	**10 429**	**1 833**	**-255**	**-444**	**11 564**	**10 693**	**1 880**	**-261**	**-455**	**11 857**
EBIT (Earnings Before Interest and Taxes)	**10 188**	**1 791**	**-249**	**-433**	**11 297**	**10 429**	**1 833**	**-255**	**-444**	**11 564**	**10 693**	**1 880**	**-261**	**-455**	**11 857**
Income from associated companies	-1	22	0	1 050	1 071	-1	23	0	1 075	1 096	-1	23	0	1 102	1 124
Interest expense					-770					-791					-811
Other financial income expense					-239					-245					-251
Income before taxes					**11 358**					**11 623**					**11 919**
Taxes					-1 534					-1 571					-1 611
Net income from continuous operations					**9 824**					**10 053**					**10 308**

Appendix D: Cash Flow Statement

	Historical			Forecasted Years					
	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Perpet.
Net income from continuing operations	**7.028**	**6.698**	**7.703**	**9.168**	**9.382**	**9.600**	**9.824**	**10.053**	**10.308**
Cash flows before working capital and provision changes from continuing operations	**14.155**	**13.088**	**13.254**	**14.023**	**13.871**	**13.721**	**13.567**	**13.402**	**13.742**
Cash flows from operating activities from continuing operations	**12.085**	**11.475**	**12.621**	**13.416**	**13.340**	**13.259**	**13.168**	**13.061**	**13.393**
Total cash flows from operating activities	**11.897**	**11.475**	**12.621**	**13.416**	**13.340**	**13.259**	**13.168**	**13.061**	**13.393**
Purchase of property, plant & equipment (CapEx)	-2.367	-1.862	-1.696	-2.477	-2.535	-2.595	-2.656	-2.719	-2.788
Proceeds from sales of property, plant & equipment	237	161	92	89	91	93	95	98	100
Purchase of intangible assets	-1.138	-1.017	-1.050	-1.326	-1.357	-1.389	-1.422	-1.455	-1.492
Proceeds from sales of intangible assets	621	847	640	520	533	545	558	571	586
Purchase of financial assets	-264	-247	-468	-509	-521	-533	-546	-559	-573
Proceeds from sales of financial assets	166	247	330	307	314	321	329	337	345
Purchase of other non-current assets	-81	-149	-42	-43	-44	-45	-46	-47	-48
Proceeds from sales of other non-current assets	0	0	1	1	1	1	1	1	1
Divestments of interests in associated companies	0	0	29	29	30	30	31	32	33
Acquisitions and divestments of businesses, net	-16.507	-765	-784	-1.146	-1.146	-1.146	-1.146	-1.146	-1.175
Purchase of marketable securities and commodities	-595	-530	-580	-662	-677	-693	-709	-726	-745
Proceeds from sales of marketable securities and commodities	262	622	549	471	482	493	505	517	530
Cash flows used in investing activities from continuing operations	**-19.666**	**-2.693**	**-2.979**	**-4.746**	**-4.831**	**-4.918**	**-5.007**	**-5.098**	**-5.227**
Cash flows used in/from investing activities from discontinued operations	8.882	-748	-140	-114	-93	-75	-61	-50	-51
Total cash flows used in investing activities	**-10.784**	**-3.441**	**-3.119**	**-4.860**	**-4.923**	**-4.993**	**-5.068**	**-5.147**	**-5.278**
Dividends paid to shareholders of Novartis AG	-6.643	-6.475	-6.495	-6.606	-6.762	-6.921	-7.084	-7.251	-7.435
Acquisition of treasury shares	-6.071	-1.109	-5.490	-4.896	-5.012	-5.130	-5.251	-5.375	-5.511
Proceeds from exercise options and other treasury share transactions	1.581	214	252	1.112	1.138	1.165	1.192	1.220	1.251
Increase in non-current financial debts	4.596	1.935	4.933	4.372	4.475	4.581	4.689	4.799	4.921
Repayment of non-current financial debts	-3.086	-1.696	-188	-1.892	-1.937	-1.983	-2.029	-2.077	-2.130
Change in current financial debts	451	1.816	-755	351	360	368	377	386	395
Acquisition of non-controlling interests	0	0	0	0	0	0	0	0	0
Impact of change in ownership of consolidated	0	-6	0	-2	-2	-2	-2	-2	-2
Dividends paid to non-controlling interests and other financing cash flows	-4	7	10	-32	-32	-33	-34	-35	-36
Cash flows used in financing activities	**-9.176**	**-5.314**	**-7.733**	**-7.593**	**-7.772**	**-7.955**	**-8.142**	**-8.334**	**-8.546**
Effect of exchange rate changes on cash and cash equivalents	*-286*	*-387*	*84*	-221	-203	-182	-130	-184	-175
Net change in cash and cash equivalents	**-8.349**	**2.333**	**1.853**	**743**	**442**	**130**	**-172**	**-605**	**-606**
Cash and cash equivalents at January	13.023	4.674	7.007	8.860	9.603	10.045	10.175	10.003	9.398
Cash and cash equivalents at December	**4.674**	**7.007**	**8.860**	**9.603**	**10.045**	**10.175**	**10.003**	**9.398**	**8.791**

Details to the consolidated cash flow statements - Adjustments for non-cash items from continuing operations

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Taxes	1106	1119	1296	1 431	1 465	1 499	1 534	1 571	1 611
Depreciation, amortization and impairments	**5575**	**6175**	**6332**	**5 529**	**5 315**	**5 126**	**4 963**	**4 821**	**4 944**
-Property, plant & equipment	1550	1591	1677	1 464	1 408	1 358	1 314	1 277	1 309
-Intangible assets	3921	4452	4399	3 841	3 692	3 561	3 448	3 350	3 435
-Financial assets	104	132	256	224	215	207	201	195	200
Income from associated companies	-266	-703	-1108	-999	-1 022	-1 046	-1 071	-1 096	-1 124
Gains on disposal and other adjustments on p	-869	-935	-1043	-1 051	-1 059	-1 067	-1 075	-1 083	-1 110
Equity-settled compensation expense	773	671	683	689	696	703	709	716	734
Change in provisions and other non-current li	1642	956	160	165	171	177	183	189	194
Net financial expense	1109	1154	738	824	919	1 026	1 145	1 279	1 311
Total	**9070**	**8437**	**7058**	**6 589**	**6 485**	**6 418**	**6 389**	**6 397**	**6 559**

Appendix E: Common-Size IS

In Millions of USD except Per Share	Historical			Forecasted Years					
	FY 2015	FY 2016	FY 2017	F2018	F2019	F2020	F2021	F2022	Perpet.
Net sales to third parties from continuing operations	99,9%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
Innovative Medicines Net Sales:	67,4%	67,1%	67,2%	71,2%	71,0%	74,2%	76,3%	78,6%	78,6%
-Gleevec/Glivec (Oncology)	9,4%	6,8%	4,0%	3,8%	3,5%	3,3%	2,9%	2,5%	2,5%
-Lucentis (Ophthalmology)	4,2%	3,8%	3,8%	3,6%	3,0%	2,9%	2,7%	2,4%	2,4%
-Consentyx (Immunology and Dermatology)	0,5%	2,3%	4,2%	4,7%	5,0%	5,5%	7,5%	8,3%	8,3%
-Gilenya (Neuroscience)	6,3%	6,4%	6,5%	6,7%	6,8%	6,8%	6,5%	6,0%	6,0%
-Galvus (Established Medicines)	2,3%	2,5%	2,4%	2,6%	2,5%	2,6%	2,5%	2,8%	2,8%
-Entresto (Cardio-Metabolic)	0,0%	0,4%	1,0%	3,5%	4,2%	5,5%	6,7%	7,5%	7,5%
-Promacta/Revolade (Oncology)	0,8%	1,3%	1,8%	2,2%	2,6%	3,0%	3,5%	4,0%	4,0%
-Tafinlar/Mekinist (Oncology)	0,9%	1,4%	1,8%	2,2%	2,5%	2,7%	3,0%	3,2%	3,2%
-Others	43,0%	42,2%	41,7%	41,9%	40,9%	41,9%	40,9%	41,9%	41,9%
Sandoz	20,4%	20,9%	20,5%	20,1%	17,4%	18,1%	15,4%	15,0%	15,0%
Alcon	12,1%	12,0%	12,3%	8,6%	11,6%	7,7%	8,3%	6,4%	6,4%
Sales to discontinues segments	0,1%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Net sales from continuing operations	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Other revenues	1,9%	1,9%	2,1%	2,1%	2,1%	2,1%	2,1%	2,1%	2,1%
Revenues	**101,9%**	**101,9%**	**102,1%**	**102,1%**	**102,1%**	**102,1%**	**102,1%**	**102,1%**	**102,1%**
Cost of goods sold	-35,2%	-36,1%	-35,0%	-33,0%	-33,0%	-33,0%	-33,0%	-33,0%	-33,0%
Gross profit from continuing operations	**66,7%**	**65,8%**	**67,1%**	**69,1%**	**69,1%**	**69,1%**	**69,1%**	**69,1%**	**69,1%**
Marketing & Sales	-23,8%	-24,7%	-26,2%	-25,0%	-25,0%	-25,0%	-25,0%	-25,0%	-25,0%
Research & Development	-18,1%	-18,6%	-18,3%	-17,0%	-17,0%	-17,0%	-17,0%	-17,0%	-17,0%
General & Administration	-5,0%	-4,5%	-4,3%	-4,9%	-4,9%	-4,9%	-4,9%	-4,9%	-4,9%
Other income	4,1%	4,0%	4,0%	3,7%	3,7%	3,7%	3,7%	3,7%	3,7%
Other expenses	-5,8%	-4,8%	-4,7%	-4,7%	-4,7%	-4,7%	-4,7%	-4,7%	-4,7%
Operating income from continuing operations	**18,2%**	**17,0%**	**17,6%**	**21,2%**	**21,2%**	**21,2%**	**21,2%**	**21,2%**	**21,2%**
EBIT (Earnings Before Interest and Taxes)	**18,2%**	**17,0%**	**17,6%**	**21,2%**	**21,2%**	**21,2%**	**21,2%**	**21,2%**	**21,2%**
Income from associated companies (Affiliate/Joint Ventures)	0,5%	1,4%	2,3%	2,0%	2,0%	2,0%	2,0%	2,0%	2,0%
Interest expense	-1,3%	-1,5%	-1,6%	-1,4%	-1,4%	-1,4%	-1,4%	-1,4%	-1,4%
Other financial income and expense	-0,9%	-0,9%	0,1%	-0,4%	-0,4%	-0,4%	-0,4%	-0,4%	-0,4%
Income before taxes from continuing operations	**16,5%**	**16,1%**	**18,3%**	**21,3%**	**21,3%**	**21,3%**	**21,3%**	**21,3%**	**21,3%**
Taxes (Income tax expenses - benefits)	-2,2%	-2,3%	-2,6%	-2,9%	-2,9%	-2,9%	-2,9%	-2,9%	-2,9%
Net income from continuing operations	**14,2%**	**13,8%**	**15,7%**	**18,4%**	**18,4%**	**18,4%**	**18,4%**	**18,4%**	**18,4%**
Net income	**14,2%**	**13,8%**	**15,7%**	**18,4%**	**18,4%**	**18,4%**	**18,4%**	**18,4%**	**18,4%**

Appendix F: Common-Size BS

In Millions of USD except Per Share	Historical			Forecasted Years					
	FY 2015	FY 2016	FY 2017	F2018	F2019	F2020	F2021	F2022	Perpet.
Assets									
Non-Current Assets									
Property, plant & equipment	12,1%	12,0%	12,4%	12,8%	13,0%	13,3%	13,5%	13,8%	13,9%
Goodwill	23,7%	23,8%	23,9%	23,1%	24,4%	25,7%	26,9%	28,6%	28,8%
Intangible assets other than goodwill	26,0%	24,1%	22,5%	20,6%	18,6%	16,8%	15,2%	13,7%	13,8%
Investments in associated companies	11,6%	11,0%	11,5%	11,7%	11,7%	11,6%	11,6%	11,5%	11,6%
Deferred tax assets	6,8%	7,7%	6,2%	6,5%	6,8%	7,0%	7,3%	7,5%	7,6%
Financial assets	1,9%	1,7%	1,7%	1,9%	2,0%	2,2%	2,4%	2,6%	2,7%
Other non-current assets	0,5%	0,5%	0,6%	0,7%	0,8%	0,8%	0,9%	1,0%	1,0%
Total non-current assets	**82,6%**	**80,8%**	**78,8%**	**77,1%**	**77,3%**	**77,5%**	**77,8%**	**78,8%**	**79,3%**
Current Assets	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Inventories	4,7%	4,8%	5,2%	4,4%	4,6%	4,4%	4,7%	4,5%	4,5%
Trade receivables	6,2%	6,3%	6,5%	6,6%	6,6%	6,7%	6,7%	6,7%	6,8%
Marketable securities, commodities, time deposits and derivative financial instruments	0,6%	0,6%	0,5%	0,5%	0,5%	0,5%	0,5%	0,5%	0,5%
Cash and cash equivalents	3,6%	5,4%	6,7%	7,2%	7,4%	7,3%	7,1%	6,5%	6,0%
Other current assets	2,3%	2,0%	2,3%	4,2%	3,6%	3,6%	3,3%	2,9%	2,9%
Total current assets	**17,4%**	**19,2%**	**21,2%**	**22,9%**	**22,7%**	**22,5%**	**22,2%**	**21,2%**	**20,7%**
Total assets	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Equity and liabilities									
Equity									
Share Capital	1,3%	1,3%	1,3%	1,3%	1,3%	1,2%	1,2%	1,2%	1,2%
Treasury shares	-0,1%	-0,1%	-0,1%	-0,1%	-0,1%	-0,1%	-0,1%	-0,1%	-0,1%
Retained earnings	89,6%	89,8%	98,7%	98,8%	98,8%	98,8%	98,8%	98,9%	98,9%
.Net income	9,1%	8,9%	10,4%	12,1%	12,1%	12,1%	12,2%	12,2%	12,3%
-Issued share capital and reserves atributable to Novartis AG shareholders	**99,9%**	**99,9%**	**99,9%**	99,9%	99,9%	99,9%	99,9%	99,9%	99,9%
Non-controlling interests	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%
Total equity	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Liabilities									
Non-current liabilities									
Financial debts	30,0%	32,4%	39,5%	37,8%	38,3%	38,6%	38,8%	39,3%	39,3%
Deferred tax liabilities	11,7%	12,1%	8,8%	9,1%	8,9%	8,8%	8,7%	8,6%	8,6%
Provisions and other non-current liabilities	14,8%	15,3%	12,0%	12,1%	12,0%	11,8%	11,6%	11,4%	11,4%
Total non-current liabilities	**56,4%**	**59,8%**	**60,2%**	**59,0%**	**59,2%**	**59,3%**	**59,1%**	**59,3%**	**59,3%**
Current Liabilities	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Trade payables	10,4%	8,8%	8,8%	8,8%	9,2%	9,0%	9,4%	9,1%	9,1%
Financial debts and derivative financial instruments	10,3%	10,7%	9,0%	10,3%	9,7%	10,1%	10,1%	10,2%	10,2%
Current income tax liabilities	3,2%	2,9%	2,9%	2,5%	2,5%	2,5%	2,5%	2,6%	2,6%
Provisions and other current liabilities	19,7%	17,8%	19,0%	19,4%	19,3%	19,1%	18,9%	18,8%	18,8%
Total current liabilities	**43,6%**	**40,2%**	**39,8%**	**41,0%**	**40,8%**	**40,7%**	**40,9%**	**40,7%**	**40,7%**
Total liabilities	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Total equity and liabilitites									

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Appendix G: Common-Size CFS

				Forecasted Years					
	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Perpet.
Net income from continuing operations	**59,1%**	**58,4%**	**61,0%**	**68,3%**	**70,3%**	**72,4%**	**74,6%**	**77,0%**	**77,0%**
Cash flows before working capital and provision changes from continuing operations	**119,0%**	**114,1%**	**105,0%**	**104,5%**	**104,0%**	**103,5%**	**103,0%**	**102,6%**	**102,6%**
Cash flows from operating activities from continuing operations	**101,6%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Total cash flows from operating activities	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Purchase of property, plant & equipment (CapEx)	-19,9%	-16,2%	-13,4%	-18,5%	-19,0%	-19,6%	-20,2%	-20,8%	-20,8%
Proceeds from sales of property, plant & equipment	2,0%	1,4%	0,7%	0,7%	0,7%	0,7%	0,7%	0,7%	0,7%
Purchase of intangible assets	-9,6%	-8,9%	-8,3%	-9,9%	-10,2%	-10,5%	-10,8%	-11,1%	-11,1%
Proceeds from sales of intangible assets	5,2%	7,4%	5,1%	3,9%	4,0%	4,1%	4,2%	4,4%	4,4%
Purchase of financial assets	-2,2%	-2,2%	-3,7%	-3,8%	-3,9%	-4,0%	-4,1%	-4,3%	-4,3%
Proceeds from sales of financial assets	1,4%	2,2%	2,6%	2,3%	2,4%	2,4%	2,5%	2,6%	2,6%
Purchase of other non-current assets	-0,7%	-1,3%	-0,3%	-0,3%	-0,3%	-0,3%	-0,4%	-0,4%	-0,4%
Proceeds from sales of other non-current assets	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Divestments of interests in associated companies	0,0%	0,0%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%
Acquisitions and divestments of businesses, net	-138,7%	-6,7%	-6,2%	-8,5%	-8,6%	-8,6%	-8,7%	-8,8%	-8,8%
Purchase of marketable securities and commodities	-5,0%	-4,6%	-4,6%	-4,9%	-5,1%	-5,2%	-5,4%	-5,6%	-5,6%
Proceeds from sales of marketable securities and commodities	2,2%	5,4%	4,3%	3,5%	3,6%	3,7%	3,8%	4,0%	4,0%
Cash flows used in investing activities from continuing operations	**-165,3%**	**-23,5%**	**-23,6%**	**-35,4%**	**-36,2%**	**-37,1%**	**-38,0%**	**-39,0%**	**-39,0%**
Cash flows used in/from investing activities from discontinued operations	74,7%	-6,5%	-1,1%	-0,8%	-0,7%	-0,6%	-0,5%	-0,4%	-0,4%
Total cash flows used in investing activities	**-90,6%**	**-30,0%**	**-24,7%**	**-36,2%**	**-36,9%**	**-37,7%**	**-38,5%**	**-39,4%**	**-39,4%**
Dividends paid to shareholders of Novartis AG	-55,8%	-56,4%	-51,5%	-49,2%	-50,7%	-52,2%	-53,8%	-55,5%	-55,5%
Acquisition of treasury shares	-51,0%	-9,7%	-43,5%	-36,5%	-37,6%	-38,7%	-39,9%	-41,2%	-41,2%
Proceeds from exercise options and other treasury share transactions	13,3%	1,9%	2,0%	8,3%	8,5%	8,8%	9,1%	9,3%	9,3%
Increase in non-current financial debts	38,6%	16,9%	39,1%	32,6%	33,5%	34,5%	35,6%	36,7%	36,7%
Repayment of non-current financial debts	-25,9%	-14,8%	-1,5%	-14,1%	-14,5%	-15,0%	-15,4%	-15,9%	-15,9%
Change in current financial debts	3,8%	15,8%	-6,0%	2,6%	2,7%	2,8%	2,9%	3,0%	3,0%
Acquisition of non-controlling interests	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Impact of change in ownership of consolidated entities	0,0%	-0,1%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Dividends paid to non-controlling interests and other financing cash flows	0,0%	0,1%	0,1%	-0,2%	-0,2%	-0,3%	-0,3%	-0,3%	-0,3%
Cash flows used in financing activities	**-77,1%**	**-46,3%**	**-61,3%**	**-56,6%**	**-58,3%**	**-60,0%**	**-61,8%**	**-63,8%**	**-63,8%**
Effect of exchange rate changes on cash and cash equivalents	*-2,4%*	*-3,4%*	*0,7%*	-1,6%	-1,5%	-1,4%	-1,0%	-1,4%	-1,3%
Net change in cash and cash equivalents	**-70,2%**	**20,3%**	**14,7%**	**5,5%**	**3,3%**	**1,0%**	**-1,3%**	**-4,6%**	**-4,5%**
Cash and cash equivalents at January	109,5%	40,7%	55,5%	66,0%	72,0%	75,8%	77,3%	76,6%	70,2%
Cash and cash equivalents at December	**39,3%**	**61,1%**	**70,2%**	**71,6%**	**75,3%**	**76,7%**	**76,0%**	**72,0%**	**65,6%**

Appendix H: Financial Ratios

	Historical				Forecasted Years					
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Perpet.
Liquidity Ratios										
Current Ratio (x)	3.26	4.59	4.74	4.48	4.35	4.40	4.43	4.44	4.56	4.56
Quick Ratio (x)	0.82	0.57	0.72	0.77	0.80	0.83	0.83	0.81	0.80	0.76
Cash Ratio (x)	0.51	0.23	0.35	0.41	0.43	0.45	0.45	0.43	0.41	0.37
Solvency Ratios										
Long term debt ratio (%)	19%	21%	24%	31%	29%	29%	29%	29%	29%	29%
Long and short term debt ratio (%)	29%	28%	32%	38%	37%	36%	37%	37%	37%	37%
Interest Coverage (x)	15.75	13.71	11.69	11.11	14.82	14.77	14.72	14.66	14.61	14.61
Debt to Equity (x)	0.77	0.71	0.74	0.79	0.76	0.76	0.75	0.75	0.74	0.75
Equity Ratio (%)	57%	59%	58%	56%	57%	57%	57%	57%	57%	57%
Equity Multiplier (x)	1.77	1.71	1.74	1.79	1.76	1.76	1.75	1.75	1.74	1.75
Profitability Ratios										
Gross Margin (%)	67%	65%	64%	65%	67%	67%	67%	67%	67%	67%
EBIT Margin (%)	21%	18%	17%	18%	21%	21%	21%	21%	21%	21%
EBITDA Margin (%)	30%	29%	29%	30%	32%	31%	31%	30%	30%	30%
Net Profit Margin (%)	20%	14%	14%	16%	18%	18%	18%	18%	18%	18%
ROA (%)	9%	5%	5%	6%	7%	7%	7%	7%	7%	7%
ROE (%)	15%	9%	9%	10%	12%	12%	12%	12%	12%	12%
Efficiency Ratios										
Total Assets turnover (x)	0.43	0.38	0.38	0.38	0.38	0.38	0.38	0.39	0.39	0.39
Accounts receivable turn	6.48	6.16	6.03	5.83	5.77	5.77	5.77	5.77	5.77	5.77
Accounts payable turnov	3.00	3.14	3.32	3.42	3.21	3.21	3.21	3.21	3.21	3.21
Inventory turnover (x)	2.60	2.83	2.81	2.62	2.70	2.70	2.70	2.70	2.70	2.70

Appendix I: Income Statement main assumptions

Net Sales:

	Historical				
	FY 2014	FY 2015	FY 2016	FY 2017	Assumptions
Net Sales					
Innovative Medicines Net Sales:	60,65%	67,45%	67,11%	67,25%	
-Gleevec/Glivec (Oncology)	9,05%	9,42%	6,85%	3,96%	more 3 years with net to sales > 3%
-Lucentis (Ophthalmology)	4,66%	4,17%	3,78%	3,84%	more 3 years with net to sales > 3%
-Consentyx (Immunology and Dermatology)		0,53%	2,32%	**4,22%**	Potential next blockbuster according news from executives at January, 24 (2018)
-Gilenya (Neuroscience)	4,73%	6,29%	6,41%	6,49%	potential to grow more at least next 7 years
-Galvus (Established Medicines)	2,34%	2,31%	2,54%	2,43%	potential to grow more at least next 7 years
-Entresto (Cardio-Metabolic)		0,04%	0,35%	**1,03%**	Potential next blockbuster according news from executives at January, 24 (2018)
-Promacta/Revolade (Oncology)		0,81%	1,31%	1,77%	potential to grow more at least next 10 years
-Tafinlar/Mekinist (Oncology)		0,92%	1,39%	1,78%	potential to grow more at least next 10 years
-Others	39,88%	42,96%	42,16%	41,74%	Average
Sandoz	18,24%	20,37%	20,91%	20,49%	Average
Alcon	20,65%	12,13%	11,98%	12,27%	Average

		Forecasted Years					
	Assumptions	F2018	F2019	F2020	F2021	F2022	Perpetuity
Income Statement Ratios							
Costs ratios							
Cost of Goods Sold to sales	**more efficient - 33%**	**33%**	**33%**	**33%**	**33%**	**33%**	**33%**
R&D to sales	**more efficient - 17%**	17%	17%	17%	17%	17%	17%
Marketing & Sales to sales	**more efficient - 25%**	25,00%	25,00%	25,00%	25,00%	25,00%	25,00%
R&D + Marketing & Sales to sales	**42%**	41,00%	41,00%	41,00%	41,00%	41,00%	41,00%
General & Administration	**5%**	4,87%	4,87%	4,87%	4,87%	4,87%	4,87%
Other expenses	**5%**	4,72%	4,72%	4,72%	4,72%	4,72%	4,72%
Interest expense to debts ratio	stable rating - interest expense 3%	2,72%	2,72%	2,72%	2,72%	2,72%	2,72%
Return on Research Capital Ratio	More efficient (with big data technologies and advance of	383,37%	415,82%	415,82%	415,82%	415,82%	416,56%
Effective Tax rate	News about Trump cuts taxes. Decrease of the tax rate 0,5-1% until 2020(new elections for US president)	13,50%	13,50%	13,50%	13,50%	13,50%	13,50%
Net Sales							
Innovative Medicines Net Sales:		71,22%	71,02%	74,20%	76,26%	78,57%	78,89%
-Gleevec/Glivec (Oncology)	more 3 years with net to sales > 3%	3,80%	3,50%	3,25%	2,90%	2,50%	1,90%
-Lucentis (Ophthalmology)	more 3 years with net to sales > 3%	3,60%	3,00%	2,90%	2,70%	2,40%	1,70%
-Consentyx (Immunology and Dermatology)	Potential next blockbuster according news from executives at January, 24 (2018)	4,70%	5,00%	5,50%	7,50%	8,25%	9,00%
-Gilenya (Neuroscience)	potential to grow more at least next 7 years	6,70%	6,80%	6,80%	6,50%	6,00%	5,00%
-Galvus (Established Medicines)	potential to grow more at least next 7 years	2,60%	2,50%	2,63%	2,54%	2,80%	2,57%
-Entresto (Cardio-Metabolic)	Potential next blockbuster according news from executives at January, 24 (2018)	3,50%	4,20%	5,50%	6,70%	7,50%	8,50%
-Promacta/Revolade (Oncology)	potential to grow more at least next 10 years	2,20%	2,60%	3,00%	3,50%	4,00%	4,50%
-Tafinlar/Mekinist (Oncology)	potential to grow more at least next 10 years	2,20%	2,50%	2,70%	3,00%	3,20%	3,80%
-Others	Average	41,92%	40,92%	41,92%	40,92%	41,92%	41,92%
Sandoz	Average	20,14%	17,39%	18,06%	15,43%	15,00%	14,78%
Alcon	Average	8,63%	11,59%	7,74%	8,31%	6,43%	6,33%

Appendix J: Balance Sheet main assumptions

Balance Sheet Ratios	Assumptions	Forecasted Years					
Asset Management		F2018	F2019	F2020	F2021	F2022	Perpetuity
Goodwill	due the Acquisition of AveXis deal of Gene therapy	0,19%	7,44%	7,56%	6,70%	8,04%	Acquisition of AveXis
Accounts Receivable turnover	5,72	5,72	5,72	5,72	5,72	5,72	5,72
Days Sales Outstanding	63,99	63,79	63,79	63,97	63,79	63,79	63,79
Inventory turnover	2,70	2,70	2,70	2,70	2,70	2,70	2,70
Days of inventory on hand	136,50						
Growth Rates							
Property, plant & equipment	3,79%	3,79%	3,79%	3,79%	3,79%	3,79%	outlier 2014/2015 (due to 3,79% aqcuisition of Glaxo Oncology)
Intangible assets other than goodwill	-8,09%	-8,09%	-8,09%	-8,09%	-8,09%	-8,09%	outlier 2014 (due to aqcuisition -8,09% of Glaxo Oncology)
Investments in associated companies	1,55%	1,55%	1,55%	1,55%	1,55%	1,55%	outlier 2014 (due to aqcuisition 1,55% of Glaxo Oncology)
Deferred tax assets	5,68%	5,68%	5,68%	5,68%	5,68%	5,68%	outlier 2014 (due to aqcuisition 5,68% of Glaxo Oncology)
Financial assets	11,10%	11,10%	11,10%	11,10%	11,10%	11,10%	outlier 2014 (due to aqcuisition 11,10% of Glaxo Oncology)
Other non-current assets	12,02%	12,02%	12,02%	12,02%	12,02%	12,02%	12,02%
Income Tax Receivables	4,91%	4,91%	4,91%	4,91%	4,91%	4,91%	4,91%
Marketable securities, commodities, time depo:	-1,22%	3,00%	3,00%	3,00%	3,00%	3,00%	3,00%
Other current assets	3,31%	4,00%	4,00%	4,00%	4,00%	4,00%	4,00%
Liabilities Management							
Accounts Payable turnover	3,21	3,21	3,21	3,21	3,21	3,21	3,21
Debt-to-equity	0,35	0,37	0,36	0,36	0,36	0,36	0,36
Commercial paper to deb	0,21	0,21	0,20	0,21	0,21	0,21	0,21
Total Debt		27 886	27 841	28 769	29 219	29 934	30 388
Commercial paper		5 986	5 666	6 023	6 112	6 207	6 340
Equity Management							
Share Capital	-0,78%	-0,78%	-0,78%	-0,78%	-0,78%	-0,78%	-0,78%
Treasury shares	-1,10%	-1,10%	-1,10%	-1,10%	-1,10%	-1,10%	-1,10%
Reserves	2,17%	2,17%	2,17%	2,17%	2,17%	2,17%	2,17%

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Appendix K: Cash Flow main assumptions

	Assumptions	Forecasted Years F2018	F2019	F2020	F2021	F2022	Perpetuity	
Cash Flow Stat								
Total cash flows from operating activities								
Cash flows before working capital and provision	**changes from continuing operations**							
Reversal of non-cash items								
Dep & Amort exp to PP&E & Acquired Intangibl	11,90%	11,90%	11,90%	11,90%	11,90%	11,90%	11,90%	
Income from associated companies								
Gains on disposal and other adjustments on pr	0,75%	0,75%	0,75%	0,75%	0,75%	0,75%	0,75%	
Equity-settled compensation expense	0,95%	0,95%	0,95%	0,95%	0,95%	0,95%	0,95%	
Change in provisions and other non-current lia	3,40%	3,40%	3,40%	3,40%	3,40%	3,40%	3,40%	
Net financial expense	11,62%	11,62%	11,62%	11,62%	11,62%	11,62%	11,62%	
Dividends received from associated companies	5,57%	5,09%	5,09%	5,09%	5,09%	5,09%	5,09%	
Interest received	0,44%	0,38%	0,38%	0,38%	0,38%	0,38%	0,38%	
Interest paid	5,00%	4,92%	4,92%	4,92%	4,92%	4,92%	4,92%	
Other financial receipts	1,72%	2,17%	2,17%	2,17%	2,17%	2,17%	2,17%	
Other financial payments	1,10%	0,88%	0,88%	0,88%	0,88%	0,88%	0,88%	
Taxes paid	14,55%	14,91%	14,91%	14,91%	14,91%	14,91%	14,91%	
Cash flows from operating activities from continuing operations								
Payments out of provisions and other net cash n	-9,18%	-9,18%	-9,18%	-9,18%	-9,18%	-9,18%	-9,18%	
Change in net current assets and other operating	-2,62%	1,50%	1,50%	1,50%	1,50%	1,50%	1,50%	
Cash flows used in investing activities from continuing operations								
Cash flows used in operating activities from disc	0,38%	0,38%	0,38%	0,38%	0,38%	0,38%	0,38%	
Purchase of property, plant & equipment	46,04%	46,04%	46,04%	46,04%	46,04%	46,04%	46,04%	outlier 2014
Proceeds from sales of property, plant & equipn	-3,42%	-3,42%	-3,42%	-3,42%	-3,42%	-3,42%	-3,42%	outlier 2014
Purchase of intangible assets	26,27%	26,27%	26,27%	26,27%	26,27%	26,27%	26,27%	outlier 2014
Proceeds from sales of intangible assets	-18,70%	-18,70%	-18,70%	-18,70%	-18,70%	-18,70%	-18,70%	outlier 2014
Purchase of financial assets	8,74%	8,74%	8,74%	8,74%	8,74%	8,74%	8,74%	outlier 2014
Proceeds from sales of financial assets	-7,03%	-7,03%	-7,03%	-7,03%	-7,03%	-7,03%	-7,03%	outlier 2014
Purchase of other non-current assets	2,45%	2,45%	2,45%	2,45%	2,45%	2,45%	2,45%	outlier 2014
Proceeds from sales of other non-current assets	-0,01%	-0,01%	-0,01%	-0,01%	-0,01%	-0,01%	-0,01%	outlier 2014
Divestments of interests in associated companie	-0,32%	-0,32%	-0,32%	-0,32%	-0,32%	-0,32%	-0,32%	outlier 2014
Acquisitions and divestments of businesses, net	46,22%	46,22%	46,22%	46,22%	46,22%	46,22%	46,22%	outlier 2014
Purchase of marketable securities and commodi	14,06%	14,06%	14,06%	14,06%	14,06%	14,06%	14,06%	outlier 2014
Proceeds from sales of marketable securities an	-14,29%	-14,29%	-14,29%	-14,29%	-14,29%	-14,29%	-14,29%	outlier 2014

Appendix L: DCF valuation

The price target was calculated using the **Discounted Cash Flow (DCF)** valuation as the principal model, to support this valuation method I've used as well the **Multiples Approach**.

Initially, to do the DCF valuation I had to compute **the Free Cash Flow To the Firm (FCFF)** and also the **weighted average cost of capital (Wacc)**. The free cash flow to the firm is the available value of cash flow from the companies' operational business after operational expenses like depreciations, taxes and working capital. The weighted average cost of capital is computed as a rate of return of Novartis AG in other words, the cost of capital of the company.

FCFF was computed following the general formula:

$$\boldsymbol{FCFF = EBIT \times (1 - Marginal\ Tax\ Rate) + D\&A - Changing\ in\ WC - CapEx}$$

In Millions of USD except Per Share	Historical			Forecasted Years					
	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Revenues	49 440	48 518	49 109	49 805	50 980	52 182	53 413	54 672	56 061
Cost of Goods Sold	-17 404	-17 520	-17 175	-16 436	-16 823	-17 220	-17 626	-18 042	-18 500
Operating Expenses	-23 059	-22 730	-23 305	-22 835	-23 374	-23 925	-24 489	-25 067	-25 703
Operating Income or Losses (EBIT)	**8 977**	**8 268**	**8 629**	**10 534**	**10 783**	**11 037**	**11 297**	**11 564**	**11 857**
Depreciation & Amortization	5471	6043	6076	5306	5100	4919	4762	4627	4744
EBITDA	**14 448**	**14 311**	**14 705**	**15 840**	**15 882**	**15 956**	**16 059**	**16 190**	**16 601**
Effective Tax Rate	13,60%	14,31%	14,40%	13,50%	13,50%	13,51%	13,51%	13,51%	13,51%
Average Effective Tax Rate	13,87%	13,87%	13,87%	13,87%	13,87%	13,87%	13,87%	13,87%	13,87%
Interest Expense	-655	-707	-777	-711	-730	-750	-770	-791	-811
Depreciation & Amortization	5471	6043	6076	5306	5100	4919	4762	4627	4744
CapEx	-2 367	-1 862	-1 696	-2 477	-2 535	-2 595	-2 656	-2 719	-2 788
Changes in Working Capital	-863	-77	244	189	192	195	198	201	206
Net Cash from discontinued operations	-188	0	0	0	0	0	0	0	0
Cash From Operations	11 897	11 475	12 621	13 416	13 340	13 259	13 168	13 061	13 393
Other operating adjustments									
Net income	7 028	6 698	7 703	9 168	9 382	9 600	9 824	10 053	10 308
FCF	**9 530**	**9 613**	**10 925**	**10 939**	**10 805**	**10 664**	**10 512**	**10 342**	**10 605**
Interest Expense	-655	-707	-777	-711	-730	-750	-770	-791	-811
Effective Tax Rate	-566	-606	-665	-615	-632	-649	-666	-684	-702
FCFF	**10 096**	**10 219**	**11 590**	**11 554**	**11 436**	**11 313**	**11 178**	**11 026**	**11 306**

The weighted average cost of capital (WACC) was computed as a rate of return of Novartis AG in other words, the cost of capital of the company and the return of the investors.

To calculate the actual WACC I've used the general formula:

$$WACC = K_e \times \frac{E}{E+D} + K_d \times \frac{D}{E+D} \times (1-t)$$

To reach the **Cost of Equity (K_e)** I based my calculations on **Capital Asset Price Model (CAPM).** The cost of equity represents the return on investing in the company,

to the stockholders side. The following general formula is the one that I used to compute cost of equity:

$$K_e = R_f + \beta_e \times ERP$$

To the first side of the formula, **Risk Free Rate (R_f)** I used the 10-year U.S. Treasury Bond Rate, considering a safety investment and where the company has almost half of their business.

To the **Equity Risk Premium (ERP)**, I used the available ERP on Damodaran considering an average between United States ERP and Europe countries where Novartis AG. works.

Finally, to compute the Levered Beta for WACC calculations I've used the following formula:

$$B_l = B_u \times \left(1 + \frac{D}{E} \times (1 - t)\right)$$

The component of unsystematic risk that I used was of the Damodaran as well and for the pharmaceutical industry.

After reached a value for cost of equity based on assumptions above, I had to determine the **Cost of Debt (K_d).** For this purpose I've used the YTM(yield to maturiry) approach.

	Historical			Forecasted Years					
	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Risk Free Rate (US bons 10 Y)	2.20%	2.20%	2.20%	2.20%	2.20%	2.20%	2.20%	2.20%	2.20%
Cost of Debt (Kd)	2.42%	2.42%	2.42%	2.42%	2.42%	2.42%	2.42%	2.42%	2.42%
Equity Risk Premium	6.34%	6.34%	6.34%	6.34%	6.34%	6.34%	6.34%	6.34%	6.34%
Unlevered Beta for industry	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Levered Beta for industry	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21
Cost of Equity (Ke)	7.23%	7.23%	7.23%	7.23%	7.23%	7.23%	7.23%	7.23%	7.23%
Debt (D)	21,931	23,802	28,532						
Enterprise Value (E)	224,665	188,611	214,647						
Debt+Equity (D+E)	246,596	212,413	243,179						
Weight of Debt D/D+E	8.89%	11.21%	11.73%	11.73%	11.73%	11.73%	11.73%	11.73%	11.73%
Weight of Equity E/D+E	91.11%	88.79%	88.27%	88.27%	88.27%	88.27%	88.27%	88.27%	88.27%

Following this assumptions, I reached this price target:

Sum of DCF	42,913
Terminal Value (TV)	188,287
Perpetual Growth	2.5%
DCF + TV	231,200
Net Debt	17,639
Equity Value	**213,561**
Shares Outstanding	2,386
Price at 16/10/2018	85.72
Price Target	**89.52**
Upside Potential	4.44%

Appendix M: Multiples valuation

I've to applied some conditions' to choose the best peers, the companies that lookalike more to Novartis AG. I based my conditions in the size of the companies in terms of sales size, Maket Capitalization size, total assets size and EBIT size.

Companies	Sales	Market Cap.	Total Assets	EBIT	Best Multiples
Novartis	50 135	196 240	133 079	8 629	
Low Range	25 068	98 120	44 360	2 876	
High Range	75 203	294 360	177 439	11 505	
Johnson & Johnson	76 450	373 490	157 303	18 607	Not Peer
Pfizer Inc.	52 546	287 870	171 797	12 305	Peer
Sanofi	43 474	108 650	119 872	12 720	Peer
Merck	40 122	151 600	87 872	6 521	Peer
Brystol Myers	20 776	99 630	33 551	5 131	Not Peer
Eli Lilly	22 871	93 150	44 981	2 197	Not Peer

Multiples Resume	2018F
EV/EBITDA	90.49
P/B	96.31
P/Sales	89.08
Average Price Target	91.96
Average Upside Potential	7.28%

Appendix L: Net Debt Forecast

In Millions of USD except Per Share	Historical			Forecasted Years					
	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Net Debt	**16 484**	**16 025**	**19 047**	**17 639**	**17 374**	**18 110**	**18 892**	**20 125**	**21 481**
Short-term Debt	5 604	5 905	5 308	5 986	5 666	6 023	6 112	6 207	6 365
Long-term Debt	16 327	17 897	23 224	21 900	22 416	22 945	23 486	24 040	24 650
Total	**21 931**	**23 802**	**28 532**	**27 886**	**28 083**	**28 968**	**29 598**	**30 247**	**31 015**
Cash and Cash Equivalents	4 674	7 007	8 860	9 603	10 045	10 175	10 003	9 398	8 791
Short-term investments	773	770	625	644	663	683	703	725	743
Total	**5 447**	**7 777**	**9 485**	**10 247**	**10 708**	**10 858**	**10 706**	**10 122**	**9 534**

Appendix L: Working Capital Forecast

In Millions of USD except Per Share	Historical			Forecasted Years					
	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Changes in Accounts Receivable	-513	-229	-204	-158	-123	-95	-74	-57	-45
Changes in Inventories	-482	-235	-247	-192	-149	-115	-90	-69	-54
Changes in Accounts Payable	378	-587	58	45	35	27	21	16	13
Increase or Decrease in Other Operating Assets or Liabilities	-246	974	637	494	383	298	231	179	139
Changes in Working Capital	**-863**	**-77**	**244**	**189**	**192**	**195**	**198**	**201**	**206**

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